2001/2002 Program Fish & Wildlife *Project Handbook*

A Guide For Projects And Partners In The Columbia Basin

Michael de Jong BC Liberal Party
Room 128, Parliament Buildings
Victoria, BC V8V 1X4

Columbia Basin

FISH & WILDLIFE Compensation Program

CBFWCP is a joint initiative between BC Hydro and the Government of British Columbia (Ministry of Water, Lands & Air Protection, BC Fisheries) to conserve and enhance fish and wildlife populations affected by BC Hydro dams. BC Hydro funds the Program $3.2 million annually and MWLAP provides valuable technical expertise.

DOC
BC
C518
D:F57
2001/02
c.3

www.cbfishwildlife.org

BC hydro

British Columbia

BC
C518
D:F57
2001/02
C.3

LEGISLATIVE LIBRARY OF BRITISH COLUMBIA
3 3298 00262 7652
102-00615/

INDEX

Section		Page
1.	2001 – 2002 Program Overview	2
2.	2000 – 2001 Annual Report	3
3.	2000 – 2001 Financial Report	4
4.	Fish & Habitat Enhancement Projects	6
5.	Wildlife & Habitat Enhancement Projects	15
6.	Evolution of Columbia Basin Fish & Wildlife Compensation Program	27
7.	CBFWCP Columbia Basin Fish & Wildlife Project Map	29
8.	Canada/US Columbia River Drainage System Map	30
9.	Chronological Facts & Events Impacting Arrow Lakes Reservoir and Kootenay Lake	31
10.	CBFWCP Projects Completed to Date (1995 – 2001) by Geographic Area	34
11.	Glossary ***(bold italic text in project descriptions)***	43
12.	Project Application Information: Overview and Objectives	56
	Large Project Application ..... ***new***	57
	Small Project Application ..... ***new***	63
13.	CBFWCP Organization and Team Member Profiles	69

Columbia Basin Fish & Wildlife Compensation Program

Columbia Basin Fish & Wildlife Compensation Program
103 - 333 Victoria Street
Nelson, BC V1L 4K3

Editor, Barry Bartlett

Canada Post 03458180
Agreement # 40024769

Dear Partner & Stakeholder:

The 2001 – 02 project year is in full swing with the Program delivering 18 fish and 24 wildlife projects with 96 partners. Our three offices in Nelson, Revelstoke and Invermere have been quiet with biologists spending most of their days in the field. Change continues to be the order of the day—both on the Program delivery level and in parent agency participation on the Policy Committee.

Stakeholders gave CBFWCP an overwhelming vote of confidence through the ***Public Opinion Survey*** conducted last year. But you also identified areas where the Program can improve. A copy of the opinion survey report card is available through our website www.cbfishwildlife.org or by contacting our Nelson office. Here are some improvements we are making to enhance the Program's effectiveness and relationship with partners and stakeholders.

Simplifying Project Application Process

Some concern was expressed with the length of time between the application deadline of August 1 and notification of the success of the application in January. We appreciate that many potential partners, particularly local conservation groups, need a more simple and spontaneous application process. We have developed separate application packages for large and small works projects which are included in this handbook. The ***Large Project Application*** is designed for more complex and scientifically rigorous projects that could be multi-year and have an annual budget greater than $10,000. The deadline for these projects is August 1 each year.

The simplified ***Small Project Application*** is geared toward local community groups requesting technical expertise and funding up to $10,000 for a one-year project. The Program has set aside $50,000 from each of the fish and wildlife budgets for these projects. Applicants are encouraged to submit small project proposals by August 1, but proposals submitted during the project year will also be considered, depending on available funding. The Program is funding nine small works projects to date this year. ***As before, any large or small project application must demonstrate it is supporting the Compensation Program's mandate of conserving or enhancing fish or wildlife populations affected—either directly or indirectly—by BC Hydro dams.***

Examples of appropriate small projects are wetland conservation/restoration, habitat enhancements for native fish, non-game and game wildlife species and conducting deer counts. To improve the chances of a successful application, prospective applicants are encouraged to discuss their project ideas with their public or First Nations representative or CBFWCP biologist. Contact information is included in the Organization and Team Member Profiles section of this handbook.

Stakeholders can also download project applications from the CBFWCP website. The website has been substantially upgraded to help meet the communication and information needs of the public and stakeholders. As well as the latest news on the Program and our projects and partners, www.cbfishwildlife.org also houses CBFWCP project reports and a search function to access information on CBFWCP's nearly 500 fish and wildlife projects to date.

We also recognize that ***volunteer co-ordinators*** and ***contract professionals*** play an important role in the successful delivery of our projects. Starting with this year's handbook, we are identifying these key people to recognize them as well.

Ministry reorganizations announced by the new Liberal Government also changed the make-up on the CBFWCP Policy Committee. ***Dick Roberts***, acting Assistant Deputy Minister, Region Operations for the Ministry of Water, Land & Air Protection has replaced Jon O'Riordan. The new Executive Vice President of BC Hydro Power Supply, ***Sandy Gillies***, replaces recently retired Blair Trousdell.

On a sad note, the Columbia Basin conservation community lost another valuable member with the untimely death of ***Ric Olmsted***, BC Hydro's fish biologist in Castlegar. Program biologists as well as many local community groups worked closely with Ric on many successful fish projects. Like forester and conservationist ***David White*** who died in an East Kootenay avalanche last winter, Ric's dedication and expertise will be difficult to replace. But their accomplishments mean they will be with us for a long time to come—Ric in the streams and rivers along the Lower Columbia and David in the grasslands and along the southerly slopes of the Rocky Mountain Trench.

Sincerely

Maureen DeHaan, Program Manager

Co-chairs Report

The Columbia Basin Fish & Wildlife Compensation Program delivered 59 fish and wildlife projects in conjunction with 123 partners at a cost of $3,333,186 during the 2000 – 01 project year. These projects involved 51 local groups and organizations and addressed the needs of 18 species at risk.

CBFWCP also benefited from a major partnership with the ***Columbia Basin Trust*** and ***Grazing Enhancement Fund***. The Trust funded $150,000 for 12 wildlife projects as part of its Terrestial Ecosystem Restoration and Conservation Program. This is in addition to the $175,000 annual contribution from ***Columbia Power Corporation/CBT*** toward the Arrow Lakes Reservoir Fertilization Project.

Fish Project Results

The Kootenay Lake and Arrow Lakes Reservoir (ALR) fertilization projects continue to be a major factor in restoring the primary productivity of aquatic ecosystems, resulting in major increases in fish populations over pre-treatment levels. Kokanee abundance in Kootenay Lake is currently 17 million, more than triple the five million kokanee in the lake when the fertilization began in 1992, while down from a peak of 25-35 million in the mid nineties. Piscivorous rainbow and bull trout as well as anglers are benefiting from the increase in kokanee. The latest ***Kootenay Lake Rainbow Trout Survey Questionnaire*** indicated anglers harvested 940 rainbow trout over seven kilograms in 1999. A total of 14,966 rainbow trout of all size classes were caught while another 34,564 trout were released. Anglers also took home 11,455 bull trout while releasing 13,543. The second year of fertilizing in the ALR contributed to significant increases in kokanee abundance—from 4.4 million in 1998 to over 10 million in 2000. ***The Hill Creek Spawning Channel***, with a capacity of 150,000 kokanee spawners, saw 142,103 return to spawn in 2000 versus 47,000 in 1996.

Nine fish projects involved population surveys and habitat assessments to establish baseline data and to measure the success of current and future enhancement activities. Resulting instream projects include the ***Murphy Creek Side Channel***, which increased rainbow trout fry production by 10,000-30,000 and doubled the rearing densities of juveniles, and the ***Blueberry Creek Barrier Evaluation & Mitigation*** that re-established access to an additional 18 km of prime rainbow trout spawning and rearing habitat.

Wildlife Project Results

The purchase of the 227-hectare East Columbia Lake property in partnership with the ***BC Conservation Foundation*** and ***The Nature Trust of BC*** secures critical habitat at risk for East Kootenay wildlife. To date, CBFWCP has contributed to acquiring nearly 3500 ha of land throughout the Columbia Basin to manage for wildlife values.

CBFWCP and project partners also enhanced over 1,300 ha of wildlife habitat using prescribed burning, slashing and noxious weed control. These activities help compensate for the loss of nearly 700 km2 of valley bottom from the creation of BC Hydro dams, which impacted important wildlife habitats such as riparian areas and wetlands. The Program also completed restoration and protection projects on three wetland sites in the East andWest Kootenay.

A number of species at risk are benefiting from CBFWCP wildlife protection efforts. Road mortalities of blue-listed painted turtles at Cranbrook's Elizabeth Lake have been eliminated after relocating the turtles' nesting sites and installing a turtle fence. Multi-year research projects on the status and ecology of red-listed East Kootenay Badger and Northern leopard frog have been completed with these projects now shifting into recovery efforts.

Public Involvement in Strategic Plan

More local groups are taking advantage of CBFWCP's Small Works Program with 11 of the 59 projects being in-season small projects under $10,000. The ***CBFWCP Steering Committee*** initiated a ***strategic planning process*** to define the future vision, strategic direction and niche for the organization for the next five years. The plan will also guide the Program's four components: fish, wildlife, communications and administration.

The strategic planning process included a one-day workshop which involved members of the Steering Committee, fish and wildlife technical committees, CBFWCP staff and key representatives from the Ministry of Water, Land & Air Protection, BC Fisheries and BC Hydro. Public and stakeholder input was provided by the public and First Nations representatives on the Steering Committee.

The strategic plan, expected to be finalized by the Policy Committee in 2001-02, will also reflect feedback from stakeholders in the 2000 ***Public Opinion Survey***. Stakeholders gave the Program a good report card with 92% favourable toward the Compensation Program and 71% who believe the Program is effective in enhancing fish and wildlife populations affected by BC Hydro dams. CBFWCP also received good performance marks for financial responsibility, partner recognition, credibility, listening, communications and administrative management. Notably, 70% are satisfied with their experience with the project application process.

continued on page 4

continued from page 3

The Steering Committee appreciates the time and candor given by stakeholders in the opinion survey. Your constructive criticism also identified areas of opportunity where the Program can improve its effectiveness and relationship with stakeholders.

CBFWCP Contributions Recognized

CBFWCP projects and staff continue to be recognized for their contributions to fish and wildlife populations. ***Ducks Unlimited*** presented a ***Sponsor in Perpetuity*** decoy for CBFWCP's contribution to the CBT-funded ***McDonald Marsh restoration project*** at Jaffray. The Upper Columbia Burbot Project by Fish ***Biologist Steve Arndt*** was featured at the ***International Burbot Symposium*** involving experts from eight countries to promote better management of burbot populations. ***Senior Wildlife Biologist John Krebs*** and the wolverine project were featured on Discovery Channel's ***Champions of the Wild*** and televised throughout Canada and the U.S. CBFWCP projects were also featured in high-profile and specialty media including the National Post, Vancouver Sun, Province, CBC Almanac, Canadian Wildlife, Beautiful BC, BC Freshwater Fishing Synopsis and Outdoor Canada.

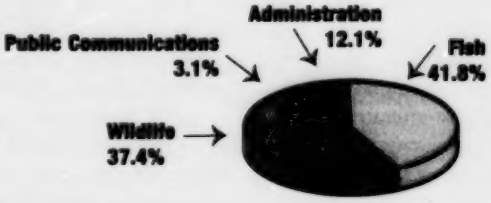
More significantly, media coverage increased substantially throughout the Columbia Basin, resulting in higher public awareness and support of the Program, projects and partners.

In conclusion, the Steering Committee supports the report card given by stakeholders and continues to be satisfied with the Program's performance and progress to date.

Jamie Alley, Hugh Smith, Scott Benton
CBFWCP Steering Committee Co-chairs

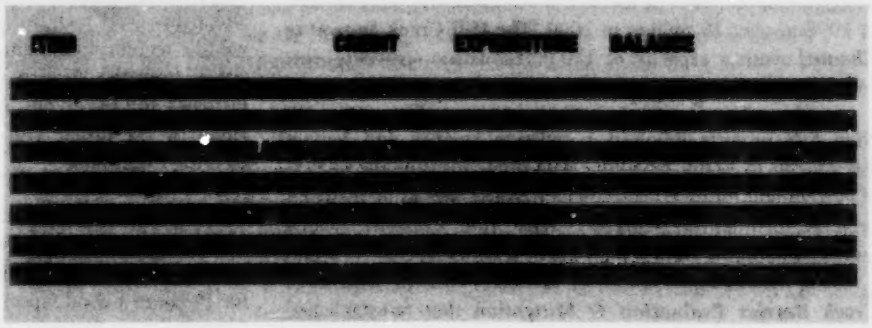
2000 - 01 Financial Report

The Columbia Basin Fish & Wildlife Compensation Program began the 2000-01 project year with a fund deposit of $3,511,701 and a carry over of $244,463 from the previous year for a total budget of $3,756,164.



Expenditures increased slightly by 1% over last year for each of the Fish, Wildlife and Administration components. Work relating to the new strategic plan as well as increased energy costs led to the 1% increase in Administration costs. Expenditures for Public Communications decreased over 10% for the same period due to continued efficiencies in the areas of electronic production and printing. The slight increase in wildlife costs related to the purchase of the East Columbia Lake property for wildlife conservation.

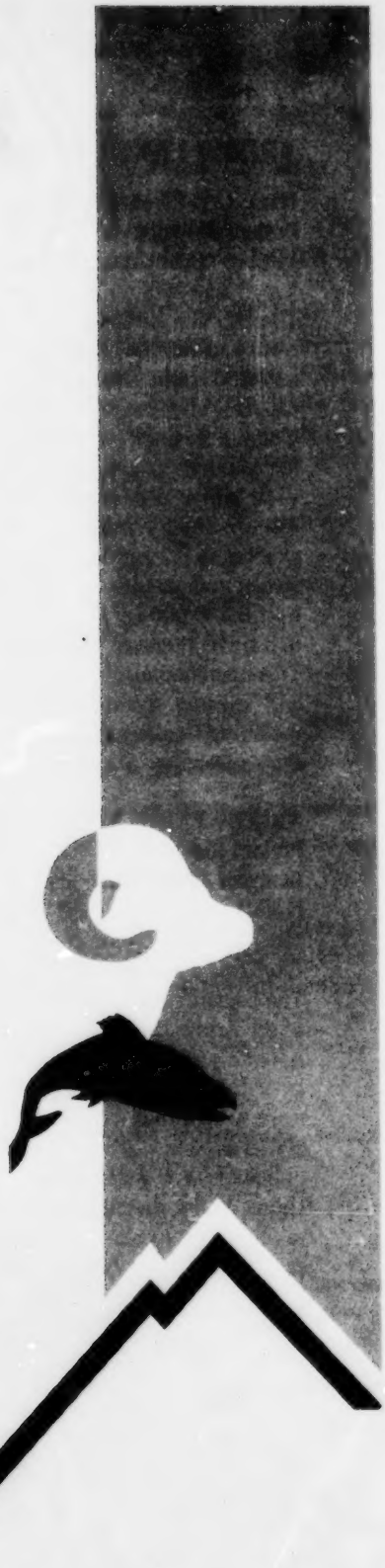
Financial Statement



Increased costs of the fertilizer contributed to the higher fisheries expenditures. The two fertilization operations and related spawning channels accounted for $1.36 million (81.5%) of the Fish budget.

Overall, the Program underspent by $211,489 (5.6%) which is carried over to the 2001-02 fiscal year.

Fish and Habitat Enhancement Projects



Columbia Basin

FISH & WILDLIFE
Compensation Program

www.cbfishwildlife.org

BC hydro

British Columbia

ARROW LAKES RESERVOIR

HILL CREEK HATCHERY & SPAWNING CHANNEL OPERATIONS — Project #F-95-L-010

Project Biologist: Bob Lindsay, Fisheries Biologist (Nelson)
Project Technician: Grant Thorp, Fisheries Technician (Nakusp)
Bob Millar, Fisheries Technician (Hill Creek)

The Hill Creek Hatchery and ***Spawning Channel*** were constructed in the early 1980's to increase ***kokanee***, ***bull trout*** and ***rainbow trout*** populations in the ***Arrow Lakes Reservoir*** impacted by the construction of ***Keenleyside*** and ***Revelstoke Dams***.

Currently, hatchery production of bull trout and rainbow trout is suspended to reduce pressure on kokanee populations during the restoration of the Arrow ecosystem. The hatchery is now being used to rear juvenile sturgeon for research purposes as part of the Upper Columbia River White Sturgeon Recovery Project to help restore the white sturgeon population on B.C.'s portion of the Columbia River.

The spawning channel provides CBFWCP with an effective indicator of the health of kokanee populations. The channel is 3.2 km long with a capacity of 150,000 kokanee spawners. Last fall, 142,103 kokanee returned to spawn compared to 47,000 in 1996 (comparison of four-year spawning cycles). These spawners produced just over 8,000,000 fry in spring 2001, the highest in many years. The survival rate of egg to fry was 38% compared to a survival rate of 5% in natural streams.

This operation also includes projects to evaluate fish-stocking in the Arrow Lakes Reservoir such as creel surveys and kokanee fry/adult enumeration. Hill Creek staff is also involved in Arrow Reservoir restoration activities including fertilizer distribution from the Galena Bay Ferry and follow-up monitoring.

Project Duration: Ongoing

ARROW LAKES RESERVOIR FERTILIZATION & MONITORING — Project #F-97-NL-019

Project Biologist: Dr. Elizabeth Wright, Lake Fertilization Co-ordinator (Nelson)
Contract Technicians: Mark Young (Nelson); Don Miller (Balfour)

Biologists monitoring the third year of fertilizing in the Upper Arrow Reservoir have observed a very healthy spring phytoplankton bloom containing good levels of edible phytoplankton at sampling stations. This is a scientific indicator that the experimental ***fertilization*** operation is working to restore reservoir productivity.

The construction of the Keenleyside, ***Mica*** and ***Revelstoke*** dams changed the flow patterns and nutrient-loading of the Arrow Lakes Reservoir and impacted the native fish populations by flooding and/or blocking migration to spawning and rearing habitat, altering water quality and decreasing reservoir ***productivity***.

In addition, mysid shrimp introduced by fisheries managers into the reservoir in 1968 as a food source for young trout were found to compete with kokanee for the same zooplankton food source. By the mid 1990's, kokanee stocks showed a general decline in spawner escapement and size in both the Upper and Lower Arrow.

Following two years of intensive studies, CBFWCP launched a full-scale fertilization program in 1999 on the Upper Arrow, the more depleted of the two basins, to restore productivity. The Arrow Fertilization Project, similar to the highly successful Kootenay Lake project, entails dispensing a special blend of ***nitrogen/phosphorus*** fertilizer from the Galena/Shelter Bay ferry on a weekly basis from April to September.

In 2000, after the first two years of fertilizing, in-lake kokanee abundance in Upper Arrow has tripled to over seven million with an estimated 10 million in the entire Arrow system. Kokanee spawner size has also jumped from 21 cm to 30 cm, the largest seen in 30 years. This ecosystem response to fertilization activities has resulted in the reopening of the Upper Arrow kokanee fishery this year with a daily catch limit of five fish.

Other natural factors, such as sunlight and spring run-off, could be contributing to the increased reservoir productivity and kokanee abundance as well. Project biologists expect to have sufficient data to more accurately determine the benefits of the fertilization operation after the five-year experimental fertilization period ends in 2004.

Detailed sampling is being conducted in tandem with the fertilizing to ensure the nutrient additions continue to

Bold and italic text – see Glossary for more information

have the desired effect on restoring reservoir productivity and to allow a quick response time for necessary adjustments to the fertilizer mix.

As well as conserving fish populations, the fertilization is benefiting the local sport fishery and providing a better food source for wildlife predators and scavengers (bears, eagles) by increasing the number of kokanee spawners.

Project Duration: Ongoing

Partners: **Ministry of Transportation; Columbia Power Corporation; University of British Columbia Ministry of Water, Land & Air Protection**

ARROW LAKES RESERVOIR TROUT & CHAR RADIO TELEMETRY Project **#F-97-M-021**

Project Biologist: Karen Bray, Fisheries Biologist (Revelstoke)

Contract Biologist: Peter Mylechreest (Revelstoke)

The life history of ***bull trout*** is poorly understood and requires extensive research, including the identification of critical habitats for staging, spawning and rearing. The most effective means of obtaining life history and fish behavior information is by using radio ***telemetry*** which saves considerable time, effort and expense. In the first three years of this project, 38 ***bull trout*** and four rainbow trout were implanted with radio tags and regularly monitored by both aerial and ground-based tracking.

This year's task is to conclude aerial and ground tracking of these fish and prepare a final report.

This project will help identify critical bull trout habitat areas which can then become the focus of future work, such as inventory or habitat ***restoration***.

Project Duration: Year 4 of 4

Partners: **Columbia Basin Trust; Local Anglers**

REVELSTOKE

LAKE REVELSTOKE RESERVOIR BULL TROUT RADIO TELEMETRY Project **#F-00-NM-042**

Project Biologist: Karen Bray, Fisheries Biologist (Revelstoke)

Contract Biologist: Peter Mylechreest (Revelstoke)

The life history of bull trout in Lake Revelstoke is poorly understood and requires in-depth investigation, including identification of critical habitats for staging, spawning, and rearing. The most effective means of obtaining this information is through radio telemetry, tagging the fish well in advance of spawning. During this project, biologists are capturing and radio-tagging 40 bull trout which they will track by airplane.

This task is the final phase of a basin-wide bull trout telemetry study that began in 1995 with Duncan River bull trout. Similar studies are currently in progress on Arrow Lakes Reservoir, Kinbasket Reservoir and the Upper Kootenay system. This study will contribute to our understanding of spawning migrations and the distribution of critical habitat for this ***blue-listed species***.

At least two years of telemetry is required to assess variability and confirm project findings. Subsequent inventory work would focus on key areas identified by the radio telemetry.

Project Duration: Year 1 of 4

Partners: **Downie Timber Ltd.; LP Engineered Wood Products Ltd.; Revelstoke Community Forest Corporation; Forest Renewal BC; Local anglers**

LAKE REVELSTOKE LITTORAL HABITAT

Project Biologist: Karen Bray, Fisheries Biologist (Revelstoke)

Lake Revelstoke was created in 1984 by flooding 184 km of the Columbia River from Revelstoke to Mica Dam. As a run-of-the-river reservoir, water level fluctuations are minimal, usually within one metre, although larger spring and winter drawdowns do occur. Although much of the land inundated is steeply sloped and was clearcut before flooding, these stable water levels are promoting the establishment of a littoral zone and serving to reduce shoreline erosion. Macrophytes are developing in sheltered embayments and along more shallow or shelf-like sections of the reservoir. The loss of littoral habitat in reservoirs that experience greater water level fluctuations is considered a significant loss to productivity. This project is for planning and developing of a more detailed project proposal under consultation with experts in the field.

Project Duration: 1 Year

Bold and italic text – see Glossary for more information

UPPER KOOTENAY

UPPER KOOTENAY BULL TROUT TELEMETRY PROJECT Project **#F-98-M-023**

Project Biologist: Bill Westover, Fisheries Biologist (Cranbrook)

This project is identifying critical spawning habitat, migration routes and holding areas for the ***blue-listed*** (threatened) ***bull trout*** in the Kootenay River mainstem between the Koocanusa Reservoir and Kootenay National Park which encompasses BC Hydro's Aberfeldie and Elko dams. Bull trout in the Upper Kootenay are known to spawn in the Wigwam River, Bull River, St. Mary's River, Skookumchuck Creek, Lussier River, Findlay River and White River. However, spawning locations within most of these systems are not known.

A total of 66 bull trout in the upper Kootenay River drainage were radio tagged during the first year of this project to track to their spawning grounds and another 4 will be tagged this year. Ten of these bull trout were radio tagged by BC Hydro in the Bull River. This task will help track radio tagged bull trout during year two of the study to identify critical bull trout habitats (summer, over-wintering and spawning) requiring habitat protection. Two major bull trout spawning areas were identified during the fall of 2000, one in the middle fork of the White River (67 redds) and the other in Skookumchuck Creek (197 redds). Columbia Basin Trust purchased 40 radio tags in 1998/99, Slocan Forest Products (Radium Division) supplied 20 radio tags and BC Hydro supplied 10 radio tags in 2000-01.

Duration: Year 2 of 2

Partners: **Habitat Conservation Trust Fund; BC Hydro; Columbia Basin Trust; Bonneville Power Administration; Slocan Forest Products (Radium Division)**

KOOTENAY LAKE

MEADOW CREEK SPAWNING CHANNEL OPERATIONS Project **#F-95-L-011**

Project Biologist: Bob Lindsay, Fisheries Biologist (Nelson)

Project Technician: John Bell, Fisheries Technician (Nelson)

Contract Technicians: Murray Pearson (Meadow Creek); Stan Baker (Meadow Creek)

The Meadow Creek ***Spawning Channel*** was built in 1967 by BC Hydro to compensate for the loss of spawning habitat for approximately 2.8 million ***kokanee*** as a result of the construction of Duncan Dam.

This facility is required to help ***sustain*** Kootenay Lake kokanee, which provide the forage base for ***bull trout*** and Kootenay Lake's world famous Gerrard rainbow trout. The spawning channel also serves as a base for kokanee egg collection operations for the provincial fish culture program.

Monitoring of adult ***escapement*** to Meadow Creek and nearby reaches of the Lardeau River is undertaken each year to measure trends in kokanee abundance. ***Fry*** production is measured each spring. The channel is 2.9 km long with a capacity of 250,000 kokanee spawners. Last fall, 560,000 kokanee returned to spawn in the channel and nearby Lardeau River, compared to 1.44 million in 1997 (comparison of four-year spawning cycles). The decline is partly attributed to the reduction in fertilizer applied to the North Arm of Kootenay Lake. These spawners produced around 19.8 million fry in spring 2001. The survival rate of egg to fry was 62.5% compared to a survival rate of 5% in natural streams.

Major maintenance and upgrades at the facility are required regularly, which can include channel modifications, gravel, weir and bridge replacements and John Creek Diversion flood protection. In addition, gravel scarification and settling pond cleaning are required annually. Half of the upper diversion fence structure was replaced in 1998. The other half was completed this spring.

Project Duration: Ongoing

Bold and italic text – see Glossary for more information

KOOTENAY LAKE FERTILIZATION & ADAPTIVE MANAGEMENT Project **#F-95-L-012**

Project Biologist: Dr. Elizabeth Wright, Lake Fertilization Co-ordinator (Nelson)

Contract Technicians: Mark Young (Nelson); Don Miller (Balfour); George Veale (Balfour)

Fertilizer levels for 2001 have been increased to the 1992 level of 47 tons with a goal of increasing and maintaining kokanee populations of 25-35 million. The amount of fertilizer applied in the North Arm had been reduced from 47 tons to 22 tons over a two-year period starting in 1997 when the lake began to exhibit signs of being over-fertilized. Over-fertilization could result in water quality concerns and the excessive growth of blue-green algae which is detrimental to kokanee production. However, kokanee abundance showed a significant decrease in 1998 and 1999 and, as a consequence, the amount of fertilizer was increased in 2000 to 29 tons. Hydro-acoustics conducted in the fall estimated kokanee populations to be around 17 million fish. This is up significantly from five million in 1991 but down from the 25-35 million kokanee recorded in the lake in the mid 1990's.

There was a concern that the poor ***Gerrard rainbow trout*** fishery in fall/winter 2000 was a result of the reduction in fertilizer loading and the subsequent decrease in kokanee abundance over the last few years. This spring, 732 Gerrard rainbow trout returned to spawn in the Lardeau River. While this number is down slightly from the previous five years, it is consistent with the annual number of spawners over the past 10 years.

This project is resulting in major conservation benefits to Kootenay Lake fish populations and the sport fishery, particularly for kokanee, bull trout and Gerrard rainbow trout. In addition, wildlife predators and scavengers including bears and eagles will benefit from the increased food supply.

Biologists now know the upper and lower limits of fertilizer levels and will make incremental adjustments as needed in future years.

Project Duration: Ongoing

Partners: **University of BC; Ministry of Water, Land & Air Protection**

BASIN WIDE

KOKANEE SPAWNING SURVEYS Project **#F-96-L-016**

Project Biologists: Bill Westover, Fisheries Biologist (Cranbrook)
Karen Bray, Fisheries Biologist (Revelstoke)

This project combines ongoing **kokanee** spawning surveys in the Revelstoke, **Kinbasket** and **Koocanusa** reservoirs. Kokanee were introduced to the newly formed Lake Koocanusa Reservoir in the mid-1970's. They have since become the major target species in this important international fishery. Over 95% of kokanee production occurs in BC. Biologists have a 5-year data series on the relative abundance of spawning kokanee and have identified some of the most important spawning streams. This task calls for helicopter surveys to be conducted on 11 streams in the Kootenay basin upstream of the International Boundary in order to establish trend data on these systems.

The kokanee population in Kinbasket Reservoir also expanded dramatically following the initial introduction. Aerial kokanee spawning surveys of the Upper Columbia drainage have been undertaken in 1996 1997, 1998 and 2000 to provide an index of escapement and to identify important spawning streams. Kokanee from Kinbasket Reservoir have been entrained into **Lake Revelstoke Reservoir** and have established spawning populations in a number of tributaries.

Kokanee have become a keystone species in these reservoirs and support the sport fishery as well as provide forage for bull trout. Kokanee escapement provides a relatively inexpensive index to the "health" of the fish communities in these reservoirs.

The Revelstoke and Kinbasket tributaries will be surveyed from Revelstoke by CBFWCP staff while the Upper Columbia tributaries will be surveyed from Cranbrook by MWLAP staff.

The goal is to monitor kokanee escapement on a continuing basis as an indicator of changes in the fish communities in reservoirs impacted by BC Hydro dams.

This long-term trend data can provide an insight to changes in the fish community and the trophic status of reservoirs.

Duration: Ongoing

Partners: **BC Hydro; Columbia Basin Trust; Ministry of Water, Land & Air Protection; Montana Dept. of Fish, Wildlife & Parks**

Bold and italic text – see Glossary for more information

FISHERIES PROGRAM DELIVERY – Small Works Projects Project **#F-00-L-001**

Project Biologist: Harald Manson, Senior Fisheries Biologist (Nelson)

Well-planned and coordinated projects using a combination of biologist expertise, volunteer time and limited funds can stretch resources to successfully deliver many small, yet important, fisheries enhancement activities. This project will identify and develop small works projects, collect background information, identify appropriate partners and evaluate completed enhancement projects on an ongoing basis.

To encourage local community involvement and to provide project opportunities for motivated conservation groups, CBFWCP set aside $50,000 this year for fish projects up to $10,000 each for which local groups can submit proposals anytime during the Program year.

The Small Works projects give CBFWCP some flexibility in working with local groups to deliver less costly projects that arise during the program year. A by-product of working with community groups is increasing the public's understanding and active support of fish and their habitat requirements.

Project Duration: Ongoing

Partners: **Various community groups**

SMALL WORKS PROJECTS - FISH

Geographic Area: Upper Columbia

ILLECILLEWAET AND BEAVER RIVER WATERSHED ATLAS

Project Biologist: Karen Bray, Fish Biologist (Revelstoke)

The Illecillewaet River is a major tributary to the Upper Arrow Reservoir, originating at the Illecillewaet Glacier and discharging at the city of Revelstoke. The river has been subject to a century of human impact as a result of exploration, rail and road construction, logging, and urban development. While many businesses, agencies and groups have an interest in the Illecillewaet River for commerce, conservation or recreation, there is little integrated information on the river system.

To date, this project involved: collecting information and data sets already available on the physical and biological parameters; producing a resource atlas on the Illecillewaet River watershed using the existing information; continuing to collect missing information; developing partnerships; and helping to identify issues and knowledge gaps. An atlas has been developed which is available on the Columbia Mountains Institute website **www.cmiae.org**

This year's activities include the compilation and posting of new aquatic information maps on the website in partnership with Parks Canada.

Partners: **Parks Canada; Columbia Mountains Institute of Applied Ecology**

COLUMBIA LAKE BURBOT POPULATION ESTIMATE

Project Biologist: Steve Arndt, Fisheries Biologist (Nelson)

Contract Biologist: Scott Cope (Cranbrook)

Burbot, a freshwater member of the cod fish family, are a species of special concern in the Kootenays with ***red-listed*** (endangered) populations in Kootenay Lake, Kootenay River and Columbia River below Keenleyside Dam.

This project supplements other long-term studies of burbot ecology in Columbia Lake and takes advantage of 1,000 fish marked in the lake from a study of spawning fish in January-February 2001. Previous radio-***telemetry*** data has shown that these fish distribute themselves throughout the lake after spawning. No fish were observed to leave the lake.

The objective of this project is to obtain an estimate of the total number of adult burbot in Columbia Lake. This will provide the only burbot population estimate for any lake in the Kootenays.

Cod traps will be used to capture burbot at various locations in the lake for a 10 to 15 day period after ice out. An estimate will be calculated from the ratio of marked/unmarked fish in the catch. The information gained will help maintain long-term sustainability of the burbot fishery in Columbia Lake.

Project Duration: 1 Year

Partners: **Columbia-Kootenay Fisheries Renewal Partnership; Ministry of Water, Land & Air Protection; Local anglers**

LOWER COLUMBIA & KOOTENAY DRAINAGE

MURPHY CREEK SIDE CHANNEL SPAWNER COUNTS & INTAKE MONITORING

Project Biologist: Steve Arndt, Fisheries Biologist (Nelson)

The Trail Wildlife Association (TWA) constructed and maintained a side channel of Murphy Creek below Highway 22 in the early 1990's after discovering rainbow trout were unable to access the upper steam because of a highway culvert and the velocity of the current.

A new intake was installed in the side channel of Murphy Creek in November 1999 which was funded by Columbia-Kootenay Fisheries Renewal. The numbers of spawning rainbows and water levels in the channel will be monitored to ensure proper functioning. Future work may also include installing baffles in a highway culvert to reduce water velocity and improve opportunities for fish passage.

Project Duration: 1 Year

Partner: **Trail Wildlife Association**

BLUEBERRY CREEK BARRIER EVALUATION & MITIGATION

Project Biologist: Steve Arndt, Fisheries Biologist (Nelson)

Volunteer Co-ordinators: John Cameron (Black Creek); Grace Conzon (Trail)

Blueberry Creek is a tributary of the Columbia River near Trail that provides productive spawning and rearing habitat for rainbow trout. CBFWCP has been involved with local residents and the Ministry of Transportation in evaluating three man-made barriers for possible modifications in the lower reaches of the creek. Work to improve fish passage has been done at all three barriers with completion of work on the third barrier planned for this year. MoT has provided the bulk of funding and CBFWCP has assisted in design and monitoring. Volunteers are monitoring fish jumps at the barriers while biologists are working with MoT and landowners to evaluate the success of past work and identify additional opportunities to further improve fish passage.

Duration: 1Year

Partners: **Trail Wildlife Association; Blueberry Creek Irrigation District; Local Volunteers; Ministry of Transportation**

SPROULE CREEK CULVERT PASSAGE & REHABILITATION

Project Biologist: Steve Arndt, Fisheries Biologist (Nelson)

The Nelson District Rod & Gun Club (NDRGC) submitted a proposal to CBFWCP to undertake Sproule Creek in-stream habitat enhancements to benefit the spawning and ***rearing*** of rainbow trout from Kootenay Lake. A part of Sproule Creek flows through the Marsden Face property purchased by CBFWCP, NRGC and the Rocky Mountain Elk Foundation in 1995 for its ungulate winter habitat and wildlife corridors.

Biologists have collected baseline data on the Compensation Program's portion of Sproule Creek including summer and winter temperatures, out-migrating fry and juvenile densities. Juvenile trout were present as well as large adults during spawning time in some years, but juvenile trout densities were low and channelization has resulted in poor habitat conditions for both spawning and rearing.

A portion of the lower reach is owned by Cominco as well as the Ministry of Transportation whose highway culvert prevents fish access to upper reaches. An engineer's report recommended the CBFWCP portion of Sprouie Creek as well as the adjacent Teck Cominco section be rehabilitated according to Watershed Restoration manual techniques and that experimental off-channel ponds be constructed in the lower section.

MoT intends to improve fish passage through the culvert this year when Kootenay River water levels are favourable. A rehabilitation plan will be prepared for the Marsden Face and Teck Cominco properties. NDRGC members are volunteering to help complete the work as well as contributing to the funding through grants from Columbia Power Corporation and Patagonia/Snowpack Outdoor Experience. The proximity to Nelson offers excellent public education opportunities for Sproule Creek as a demonstration stream for spawning and ***rearing habitat***.

Duration: 1 Year

Partners: **Nelson District Rod & Gun Club; Columbia Power Corporation; Ministry of Transportation; Teck Cominco; Patagonia/Snowpack Outdoor Experience**

Bold and italic text – see Glossary for more information

CHINA CREEK HABITAT INVENTORY

Project Biologist: Steve Arndt, Fisheries Biologist (Nelson)

Local residents have reported there is fairly productive habitat upstream on China Creek. However, a highway culvert appears to be a barrier to fish passage. CBFWCP is acting upon a Ministry of Transportation recommendation to conduct an inventory of the upstream habitat to determine if the cost of remediation work on the barrier would be justified. Future work may also include installing baffles in the culvert to reduce water velocity and improve opportunities for fish passage.

Duration: 1 Year

Partner: **Ministry of Transporation**

SALMO RIVER RAINBOW TELEMETRY STUDY

Project Biologist: Steve Arndt, Fisheries Biologist (Nelson)

Contract Biologist: James Baxter (Nelson)

The Salmo River Watershed supports one of the few riverine rainbow trout populations in the West Kootenay area. This population has been affected by the construction of the Seven Mile Dam which impounded fish habitat in the lower Salmo River and prevented movement from the Columbia River. However, there is little information about the life history, population dynamics and habitat use of this species in the watershed. This project will help identify spawning, feeding and overwintering areas of rainbow trout through the use of radio telemetry. This data will document critical habitats for conservation and identify whether habitat compensation options should be focused on the Salmo River mainstem or tributaries. The radio tags will also be used in conjunction with snorkel surveys to derive a population estimate in the mainstem.

Duration: 1Year

Partners: **Salmo Watershed Streamkeepers Society; BC Hydro; University of BC; Ministry of Water, Land & Air Protection**

LOWER COLUMBIA RAINBOW TROUT STUDIES – THE ROLE OF TRIBUTARIES

Project Biologist: Steve Arndt, Fisheries Biologist (Nelson)

CBFWCP has conducted counts of emigrating trout from suspected important tributaries in the Columbia River in the previous two years. Findings include approximately 80,000 fry emigrated from each of Murphy and China Creeks and 20,000 from Blueberry Creek by early August, 2000. This year's project is completing the analysis of data and generating a report from scale samples to better understand the relative importance of the tributary habitats for fry production. The results could help identify other spawning and rearing habitat ***enhancement*** opportunities in Lower Columbia River tributaries.

Project Duration: 1 Year

Partners: **BC Hydro; Trail Wildlife Association**

DEER CREEK HABITAT RESTORATION

Project Biologist: Harald Manson, Sr. Fisheries Biologist (Nelson)

Volunteer Co-ordinators: John Erikson, Ken Carter (Deer Park)

Deer Creek is a tributary to lower ***Arrow Reservoir*** that was identified in a 1996 fisheries assessment as requiring habitat enhancement. A major impediment was a government water survey weir that blocked kokanee from accessing spawning grounds above the weir.

A new water survey metering station was installed last year further upstream and above an impassable falls. This year, biologists are working with residents of Deer Park and Kalesnikoff Lumber, in partnership with Forest Renewal BC, to remove the obsolete water survey weir prior to September's kokanee spawning run. The removal of this obstruction will provide kokanee with access to an additional 1.4 kilometers of spawning habitat.

Biologists will continue to monitor kokanee and rainbow trout spawning runs to assess the benefits of the weir removal as well as identify additional enhancement opportunities.

Partners: **Deer Creek Residents; Kalesnikoff Lumber; Forest Renewal BC; Water Survey of Canada; Ministry of Water, Land & Air Protection**

Bold and italic text – see Glossary for more information

NORNS CREEK HABITAT REHABILITATION MONITORING

Project Biologist: Steve Arndt, Fisheries Biologist (Nelson)

Volunteer Co-ordinator: Fred Salekin (Castlegar)

Biologists and local volunteers are monitoring ***rehabilitation*** work completed in previous years on Norns Creek, considered one of the most important spawning tributary of the Columbia River below ***Keenleyside Dam*** for rainbow trout. However, the availability of spawning gravel and the number of spawners had decreased since 1990. This project was designed to improve spawning conditions for rainbow trout and enhance rearing habitat for juvenile rainbow trout.

A 65 metre-long eroding bank was stabilized using a combination of rip-rap and bioengineering methods. Another 200 cubic metres of graded rip-rap was used to protect the bank up to the bankful elevation. Two rock spurs were then integrated into the rip-rap to direct flows away from the bank during significant discharges such as freshets. Finally, the area upslope of the rock work was treated with a mixture of grasses, coconut mats and live willow-dogwood stakes to increase root mass.

After being in place for two freshets, these permanent structures have formed productive pools and good tailouts. Kokanee have been observed using their enhanced spawning habitat and juvenile trout are using the log structures and riprap.

One modification being considered this year is installing livestock fencing to protect plantings in the reach downstream of Robson Road.

Project Duration: 1 Year

Partners: **Castlegar & District Wildlife Association; Columbia Power Corporation; Peter Kiewit Sons Ltd.**

Bold and italic text – see Glossary for more information

Wildlife and Habitat Enhancement Projects

Columbia Basin

FISH & WILDLIFE
Compensation Program

www.cbfishwildlife.org

BC hydro

BRITISH COLUMBIA

ARROW LAKES VALLEY

WEST KOOTENAY UNGULATE ENHANCEMENT PROJECT Project **#W00NL017**

Project Biologists: John Krebs, Senior Wildlife Biologist (Nelson)
John Gwilliam, Wildlife Biologist (Nelson); Ross Clarke, Wildlife Biologist (Nelson)
Summer Student Wildlife Technicians; Thomas Hill, Aaron Reid (Nelson)
Nicole Thomas, Tim Van Wijk (Pend d'Oreille)

This year's project involves the Pend d'Oreille/South Salmo, Arrow Lakes Valley, Revelstoke, Kootenay Lake and Creston areas.

Low elevation, south-facing slopes provide critical winter habitat for elk and deer in the West Kootenay. Fire traditionally played a key role in maintaining a mosaic of mature coniferous and open, early seral-stage (phase after natural disturbance such as forest fire) habitat. The primary focus of this project is maintaining these early seral conditions on ***ungulate*** winter range by using slashing and burning treatments to mimic historical natural disturbance patterns in a controlled fashion. Planned activities for this project year include:

Project Development

- NDT4 habitat (Natural Disturbance Type: fire-maintained ecosystem) occurs in the vicinity of the Lower Arrow Lake. Much of the area has been affected by conifer encroachment and fire suppression. In conjunction with the BC Forest Service and potentially BC Parks, an enhancement/restoration plan for a portion of this area will be completed following NDT4 guidelines in the Kootenay-Boundary Land Use Plan. The first phase is to conduct a fire history study.
- **Prescribed burning** opportunities in the Creston area will continue to be investigated in conjunction with the Creston Rod & Gun Club. This year the focus is in the Little Moyie River area. Three burn sites were verified on Kitchener Mountain, one of which will need to be treated prior to burning to get rid of spotted ***knapweed***.
- Slashing/burning opportunities in the area between Enterprise Creek and Summit Lake, in conjunction with the New Denver Friends For Wildlife, are being investigated and catalogued.
- Finalise planning for a prescribed burn in Johnson Creek for spring 2002.
- Investigate prescribed burning/slashing opportunities south of Rosebud Lake near Billy and Eldorado Creeks. Shelter Bay, Grohman Creek, Cranberry Creek, Benton Creek, Arrow Creek, Murphy Creek, Sentinel Mountain and Duncan Dam/BC Hydro property will also be assessed.
- Plan for a prescribed burn above the confluence of the Salmo and Pend d'Oreille Rivers to benefit ***mule deer*** and elk.
- Finalise the Pend d'Oreille pesticide use permit application for 2001-2003. Noxious weeds will be treated on a limited basis on MWLAP/CBFWCP property. This is necessary because the weeds are seriously degrading wildlife habitat.
- Plan (including silviculture plan) for reduction of conifer stocking levels on 9ha of CBFWCP/MWLAP property on the Coleman Ranch.

II Project Implementation

A). Arrow Lakes:

The south slopes adjacent to the Arrow Lakes provide winter habitat for deer, elk and moose. To maintain/improve habitat values in these areas the following vegetation manipulation/planning activities will be undertaken.

1. Plan and execute NDT4 habitat restoration on the Broadwater and Deer Park properties.
2. Implement old growth enhancement treatment using slashing and/or thinning techniques within Hamlin Creek CBFWCP/MWLAP property.

B). Pend d'Oreille:

The south slopes above the Pend d'Oreille River provide winter habitat for white-tailed deer while the slopes above the South Salmo River provide winter habitat for mule deer, elk and ***Rocky Mountain bighorn sheep***. To

Bold and italic text – see Glossary for more information

maintain/improve the habitat values on these winter ranges the following vegetation manipulation activities will be undertaken to improve ungulate browse and cover values.

1. Conduct 3 prescribed burns in spring 2001: Pete Creek (60ha), Wallack Creek (60 ha) and Rosebud Lake (40ha).
2. Slash 5ha of deciduous shrubs and trees that has grown out of reach of browsing white-tailed deer and elk in the Tillicum Creek drainage (CBFWCP/MWLAP property) in the Pend d'Oreille Valley.
3. Selkirk College first year wildlife students will slash 3-4ha of deciduous shrubs for browsing white-tailed deer in the Pend d'Oreille Valley near Limpid Creek.

C) Kootenay Lake

1. Meadow Creek (CBFWCP/The Nature Trust Property): slash browse species on 10 ha in partnership with the North Arm Wildlife Club.

D) Revelstoke/Big Bend

1. Slash deciduous shrubs and conifer ingrowth on an 8ha site near Crawford Creek.
2. Create small openings on CBFWCP/MWLAP property near Wallis Creek.

E) Creston

1. Conduct two burns on Kitchener Mountain, east of Creston and control small outbreak of spotted knapweed on another potential site.

III Project Monitoring

1. Monitor vegetation on past habitat enhancement activities at Crawford Creek, Marsden Face and Rosebud Lake.
2. Establish pre-treatment plots on proposed habitat enhancement sites as required by the Enhancement Monitoring Strategy.
3. Monitor NDT4 habitat enhancements near Deer Park.

These three phases of habitat management are necessary on a long term basis to measure the effectiveness of these habitat inhancement activities. Benefits include improved moose, elk and mule deer winter browse values as well as increased wildlife viewing and hunting opportunities.

Duration: Ongoing

Partners: **Habitat Conservation Trust Fund; Ministry of Water, Land & Air Protection; Ministry of Forests; Selkirk College; Creston Rod & Gun Club; New Denver Friends for Wildlife; Duncan-Lardeau Advisory Committee; Trail Wildlife Association**

WEST KOOTENAY MULE DEER PROJECT Project **#W96-M-006**

Project Biologist: John Gwilliam, Wildlife Biologist (Nelson)

Contract Biologist: Hugh Robinson, Washington State University Zoology Masters Student

Wildlife Technician: Malcom Dennington (Creston)

Mule deer management and conservation continue to be top priority items internationally, regionally and locally. The remaining 19 collared mule deer will be monitored for survivorship and cause-specific mortalities for an additional year. This data is critical to the implementation of the recommendations of the mule deer project. A combination of fixed wing aircraft and ground telemetry will be used to monitor the project. In some instances, where deer die in remote (roadless) locations, helicopters must be used for access. To date 22 of 42 collared deer have died with cougars and motorists being responsible for the greatest portion of the deaths. The results of the project were presented at Carnivore 2000, in Boulder, Colorado in November 2000. Products of the project will include a progress report summarizing the last 2.5 years of field work and various journal articles. Some components of the data were incorporated into a mountain lion report which was presented at a symposium in San Antonio, Texas in December 2000.

This increased knowledge of ***mule deer*** densities, survivorship and migration patterns should result in improved mule deer management and healthier deer populations.

Project Duration: Year 6 of 5

Partners: **Ministry of Forests, Small Business Division; Ministry of Water, Land & Air Protection**

Bold and italic text – see Glossary for more information

SOUTH SELKIRK COUGAR ECOLOGY & PREDATION STUDY Project **#W98-M-125**

Project Biologist: Ross Clarke, Wildlife Biologist (Nelson)
Project Technician: Dave Lewis, Wildlife Technicial (Invermere)
Project Pilot: Dave Mairs (Revelstoke)
Houndsmen: Stu Hawes (Nelson); Dave Basaraba (Creston); Mike Dawson (Castlegar)

In 1998, CBFWCP, in partnership with Columbia Basin Trust and Ministry of Water, Land & Air Protection, initiated a cougar ecology and predation study to gather information on the South Selkirk cougar population to help reduce or reverse the losses of the red-listed ***mountain caribou*** to cougar predation. A parallel effort is currently underway in Washington State and Idaho through a graduate student out of Washington State University (WSU). The five-year project is also utilizing the expertise and knowledge of local houndsmen in capturing, collaring and monitoring cougars in a 2,630 km^2 area south of the West Arm of Kootenay Lake and between Creston and Salmo. Biologists need to understand how cougars interact with caribou and other ***ungulates*** to aid in identifying the most effective options for ***conserving*** the endangered South Selkirk caribou herd.

They have trapped and radio-collared 17 cougars over three years, of which only eight are remaining. In the past year, there were three mortalities in the South Selkirk population of 34 caribou. The causes of these mortalities are unknown. Two caribou mortalities in 1999 were attributed to one collared male cougar that was later shot.

2001/2002 activities will include: continuing aerial telemetry and kill site investigations; beginning to analyze seasonal movements and home range data; and designing a cougar population study using DNA analysis of hair samples.

By determining the extent of cougar predation on caribou and mule deer and whether all cougars or only specific individuals prey on caribou, management recommendations can be developed for cougars in the South Selkirk Mountains.

In addition, this project will result in improved knowledge of habitat requirements and ***home range*** needs of a hunted population of cougars.

Project Duration: Year 4 of 5

Partners: **Habitat Conservation Trust Fund; Local houndsmen; Washington Dept. of Fish & Wildlife; Washington State University; Columbia Basin Trust; Ministry Water, Land & Air Protection**

KOOTENAY LAKE

NORTHERN LEOPARD FROG RECOVERY PROJECT Project **#W00-NM-010**

Project Biologist: Doug Adama, Wildlife Biologist (Invermere)
Contract Biologists: Marc-Andre Beaucher, Kate Lansley (Creston)

Northern leopard frogs in British Columbia are considered ***red-listed*** both provincially and federally. Inventory work conducted in the Columbia Basin between 1996 and 1999 demonstrated that leopard frogs occur in only a single population of approximately 1,000 individuals in the Creston Wildlife Management Area. Only 29 eggs masses have been found at two breeding sites over 4 years.

In 1999, CBFWCP initiated a recovery project with the long-term goals of securing the existing population and increasing their present distribution to reduce the risk of ***extirpation***.

The first three years of this project will be used to obtain important habitat information which will guide conservation initiatives such as reintroduction efforts in future years. During that period, a recovery plan will be developed by a multi-agency working group including the Ministry of Water, Land & Air Protection, CVWMA and CBFWCP. The implementation of the recovery plan is targeted from year three onwards. Continued monitoring of the existing population will occur during all years.

Work planned for this year includes: monitoring breeding activity and reproduction of the existing population; collecting habitat information for spring calling sites and over-winter sites; analyzing water chemistry at breeding sites and over-winter sites; conducting detailed assessment of candidate compartments for reintroduction; initiating an experimental captive rearing program; participating on the provincial recovery team; and completing the recovery plan.

Project Duration: Year 2 of 5

Partners: **Creston Valley Wildlife Management Area; Ministry Water, Land & Air Protection; Columbia Basin Trust**

Bold and italic text – see Glossary for more information

ROBSON VALLEY

ROBSON VALLEY LAND STEWARDSHIP Project **#W97-M-002**

Project Biologist: Larry Ingham, CBFWCP Wildlife Biologist (Invermere)

Contract Assistant: Charlie Leake (Robson Valley)

Much of the important wildlife habitat in the Robson Valley is on private land. In 1994, a plan was developed to involve landowners in a land stewardship program. A major recommendation of this plan was to identify rare and unique habitats and species before approaching every landowner. Recognizing that ***wetlands*** are under-represented on Crown lands in the Robson Valley, a follow-up project was initiated to identify the ten most desired wetland habitats on private lands in the Robson Valley area. The selection criteria included size, location, connectivity to existing Crown land and wildlife use.

Last year, CBFWCP biologists continued to meet with landowners in efforts to identify a range of enhancement and conservation opportunities. Potential projects include waterfowl nestbox and nesting platform placement, slashing deciduous habitats for ungulate enhancement, wetland protection and wetland creation.

Options being explored with landowners include: land-stewardship (landowners taking responsibility for conservation activities on their own lands), management agreements, leases, easements, covenants and land acquisition. As a result, 10 floating nest islands and a number of nest boxes have been constructed and installed to date.

This year, the biologists are continuing to identify additional habitats to pursue stewardship programs, meeting with private landowners and developing and implementing projects as they are identified.

Project Duration: Ongoing

Partners: **Robson Valley Landowners; Ministry Water, Land & Air Protection**

ROBSON VALLEY RARE BIRD SURVEY Project **#W01-NS-014**

Project Biologist: Larry Ingham, CBFWCP Wildlife Biologist (Invermere)

Contract Wildlife Specialist: Elsie Stanley (Robson Valley)

A bird survey completed in the Robson Valley in 1992 under the Mica Compensation Program documented the presence of numerous bird species of management concern. These species include the ***blue-listed*** (vulnerable) Long-billed Curlew and the ***red-listed*** (endangered) ***Lewis' Woodpecker***.

Both of these species are expected to occupy habitats on private land: the curlew in agricultural fields and the woodpecker nesting in the ***riparian*** areas within the Robson Valley.

The goal of this project is to confirm the presence of these species and provide an estimate of their densities. The resulting information will be discussed with landowners as part of the Robson Valley Land Stewardship Project to help ensure the habitat requirements of these species are maintained.

Project Duration: 1 Year

Partners: **Robson Valley Landowners; Ministry of Water, Land & Air Protection**

REVELSTOKE/BIG BEND

FEMALE WOLVERINE REPRODUCTION AND SURVIVAL Project **#W00-NM-015**

Project Biologist: John Krebs, Senior Wildlife Biologist (Nelson)

Wildlife Technician: Dave Lewis, Wildlife Technician (Invermere)

This project is continuing a field study of ***wolverine*** demographics to gather survival and reproductive data on the Revelstoke wolverine population.

Biologists are monitoring five radio-tagged female wolverines to estimate age at first reproduction, birth intervals, den site selection, kit production and survivorship.

Bi-weekly telemetry flights will be used to locate and determine survivorship and causes of any mortalities. Reproductive dens will be identified during flights and kit production estimated from visual sightings once females have weaned kits and vacated their dens.

Biologists are also completing survivorship, habitat use and food habits reports from the previous six-year Wolverine Ecology & Habitat Use project which ended in 2000.

Preliminary results suggest a probable decline of the ***blue-listed*** wolverine population in the 7,000 km(study area encompassing Revelstoke, Mica Creek and Roger's Pass.

Bold and italic text – see Glossary for more information

Continued demand for information about the project from media, as well as regional, provincial and international jurisdictions is expected. At least two additional journal publications are expected to be derived from the final report. The objective of this project is to develop progressive management and habitat preservation techniques to ensure the long-term conservation of wolverine populations.

In addition, improved information on wolverine populations will be available to trappers, resource managers and scientific community as well as the general public.

Project Duration: Year 2 of 4

Partners: **Canada Parks Service; Habitat Conservation Trust Fund; BC Forest Service; Canadian Mountain Holidays**

UPPER KOOTENAY

EAST KOOTENAY ENHANCEMENT Project **#W00-NL-018**

Project Biologists: Larry Ingham, Wildlife Biologist (Invermere)
Doug Adama, Wildlife Biologist (Invermere)
John Krebs, Senior Wildlife Biologist (Nelson)

Over the last several decades, forest in-growth has resulted in an estimated loss of 3,000 hectares annually of grassland and open forest communities in the East Kootenay Trench. The result has been the concentration of native and domestic ***ungulate*** grazing which has had negative consequences to both grassland habitats and native wildlife populations. The loss of these habitat types has been related to the decline of wild ungulate populations and to the ***extirpation*** of Columbian Sharp-tailed grouse. In response to this crisis, a variety of agencies have been working with government, particularly Ministry of Forests, to reverse this trend to the benefit of wildlife and other non-timber values.

The main goal of this project is to expedite the recovery of grassland habitat. This is facilitated by the participation by CBFWCP biologists on the Trench Restoration Committees and through the funding of grassland ***restoration*** opportunities in both the Cranbrook and Invermere Forest Districts. These opportunities are operational in nature and include the development of ***Stand Management Prescriptions*** (SMP), Burn Plans, Pre-Burn Slashing and ***Prescribed Burning***.

Monitoring and weed control will also be conducted under this project. Planned activities for this project year include:

I Project Identification/Definition

1. Participation on the Trench Restoration Committees;
2. Participate on the Radium Bighorn Sheep Working Group to co-ordinate activities between Ministry of Water, Land & Water Protection, BC Forest Service, Kootenay National Park and CBFWCP;
3. Develop SMP/Burn Plans for other priority sites as identified by the EK Trench Restoration Committee; and
4. Participation on Elk Valley Bighorn Sheep Management Committee to co-ordinate activities among the Ministry of Water, Land & Air Protection, BC Forest Service, mining companies and CBFWCP.

II Project Implementation

1. Stinky, Echo and Dry Gulch prescribed burns (1560ha);
2. Buck Lake prescribed burn (300ha);
3. Elk Valley prescribed burn (70ha);
4. Preburn slashing in the Buck Lake Pastures in the Gold/Plumbob range unit (710ha);
5. Preburn slashing in the Collvalli Pasture in the Waldo range unit (158ha);
6. Stoddart Creek Bighorn sheep enhancement (70ha);
7. Stoddart Creek leafy spurge weed control; and
8. Petarbrooke Pasture prescribed burn (80ha).

Bold and italic text – see Glossary for more information

III Project Monitoring

1. Continue vegetation monitoring on Fontaine Pasture and establish pre-treatment plots on East Buck Lake;
2. Monitor enhancement treatments near Premier Ridge;
3. Map boundaries of enhancement sites; and
4. Input and summarise vegetation monitoring data

This project is improving grassland habitat for a number of grassland-dependant wildlife species, facilitating the re-introduction of Columbian sharp-tailed grouse and providing feedback to CBFWCP about the effectiveness of treatment activities.

Project Duration: Ongoing

Partners: **Rocky Mountain Elk Foundation; Rocky Mountain Natural Resource Society; Ministry of Forests; Habitat Conservation Trust Fund; Grazing Enhancement Fund; East Kootenay Wildlife Association; Ministry of Water, Land & Air Protection; Columbia Basin Trust**

EAST KOOTENAY BIGHORN SHEEP HABITAT & POPULATION Project **#W97-M-004**

Project Biologist: Larry Ingham, Wildlife Biologist (Invermere)

Contract Biologist: Marten Jalkotzky (Calgary)

The ***Rocky Mountain Trench Bighorn Sheep*** Habitat and Population Assessment was initiated in 1995 by the East Kootenay Wildlife Association to get a better understanding of the habitats used by sheep and habitat conditions. With this knowledge, range conditions could be improved which should result in healthier populations of bighorn sheep.

In 1996-97 trapping and collaring was successfully completed at the Columbia Lake and Bull River areas. A total of 20 bighorn sheep ewes were radio collared, with equal numbers at each site. Monitoring has continued to date. Habitat use data was analysed and vegetation plots established.

It was hoped that habitat selection results would be extrapolated to the Wigwam area, however major differences in vegetation types were observed. Therefore, eight additional bighorn sheep were radio collared at Mt. Broadwood in the Wigwam area to provide the necessary information for that herd. Radio collared ewes of each herd were also visually monitored to determine reproductive success during the spring of the last two years.

Intensive monitoring continued until sheep had returned to summer ranges, at which time it was replaced by weekly aerial monitoring. Habitat use data continues to be collected and analysed to determine which habitats the sheep are selecting. Macroplots were established for vegetation composition and production, as well as pellet collection to determine diet composition and forage preference.

This year researchers will continue ***telemetry*** efforts as well as conduct sampling and lab analysis for vegetation composition, vegetation production and forage quality. Biologists are also preparing a final report summarizing bighorn sheep habitat use versus availability of habitat, recommendations for management of the species and habitat enhancement. Future activities will focus on implementing the recommendations in the final report.

Project Duration: Year 5 of 5

Partners: **Ministry of Water, Land & Air Protection: East Kootenay Wildlife Association; Habitat Conservation Trust Fund**

SMALL WETLANDS CONSERVATION IN THE ROCKY MOUNTAIN TRENCH Project**#W01-NM-016**

Project Biologist: Doug Adama, Wildlife Biologist (Invermere)

Small ***wetlands*** provide important habitat for herptiles, birds, and mammals. The flooding of hydroelectric reservoirs eliminated vast amounts of wetland habitat on the valley floor of the Rocky Mountain Trench but many smaller wetlands still occur throughout the Trench. Unfortunately, there is very little information on the distribution and status of these small wetlands, nor is there a conservation strategy that address these important habitats. A recent query of small wetlands demonstrated that the forest inventory database and Terrain Resources Information Management (TRIM) data do not adequately identify and catalogue small wetlands, identifying a need for more accurate information and mapping. Furthermore, regulations/guidelines protecting small wetland habitat appear insufficient for many wetland dependent species.

This project will provide conservation and restoration recommendations by mapping, ground truthing and cataloguing small wetlands and their wildlife values in the Rocky Mountain Trench. The first phase of this three-year project will be to identify and delineate small wetlands using the existing data sources (Hydro, TRIM, forest cover,

Bold and italic text – see Glossary for more information

etc.) and to develop a small wetland database. The second phase of the project will entail ground truthing (including habitat assessments) and additional remote sensing to verify and expand the database. The third phase will entail a risk assessment with recommendations for the conservation and restoration of small wetlands in the Rocky Mountain Trench.

Ultimately this information will provide resource managers with a wetland database to guide wetland restoration activities and wildlife inventories for wetland dependent species, and provide recommendation related to conservation of these habitats.

Duration: Year 1 of 3

MOUNTAIN GOAT LICK HABITAT ENHANCEMENT Project **#W01-NS-015**

Project Biologist: Larry Ingham, Wildlife Biologist (Invermere)

Mountain goats in the East Kootenays appear to be declining. Exact reasons for these declines are difficult to define. These goats often inhabit high elevation areas unsuitable for habitat treatment. However in the spring of most years, some mountain goats travel large distances to licking areas to supplement their bodies with mineral-rich soils. These mineral licks are often associated with escape terrain (rock bluffs or canyons) and the goats have been known to spend weeks at a time in these licks. Some of the licking areas in the East Kootenays are located at lower elevations, where treatment of surrounding habitat may be beneficial.

Treatment may include slashing adjacent to the escape terrain to increase available forage and increase predator detection distances. Since nannies often expose their new born kids to these areas, providing higher nutritional vegetation and the ability to detect predators at greater distances would also increase their survivorship during this key time. Mountain goat kids are weaned at a very early age and nannies usually only reproduce every second year. This project will identify all known mineral licks used by mountain goats in the East Kootenays, evaluate the habitat adjacent to the escape terrain associated with each lick and make recommendations for improving forage availability and predator detection distances. These efforts should result in an increase in East Kootenay mountain goats populations.

Project Duration: 1 Year

Partners: **Ministry Water, Land & Air Protection; Local Wildlife Groups**

COLUMBIA VALLEY

CONSERVATION OF BADGERS IN THE EAST KOOTENAYS Project **#W01-NM-008**

Project Biologist: Larry Ingham, Wildlife Biologist (Invermere)

Contract Biologist: Nancy Newhouse, (Invermere)

Yellow badgers are ***red-listed*** (endangered) in British Columbia. An intensive radio ***telemetry*** project has been underway in the East Kootenay since 1995 to: help improve knowledge of badger habitat requirements and distribution; assess habitat enhancement potential for badgers; and increase public awareness of badger/grassland association and conservation needs.

During this time, 19 badgers have been radiotagged and monitored and a habitat suitability map prepared. Results of this project indicate reproductive success is extremely low for badgers, especially in the Upper Columbia Valley, and that mortality is high, particularly for juveniles. Large home ranges also indicate a low population density. Preliminary assessments of historic numbers, based on anecdotal accounts coupled with habitat assessments, suggest that the badger population has declined within the last 20 years. Habitat loss, particularly to urbanization and forest in-growth, has likely contributed to the decline. But shooting, roadkills and predation may have pushed a vulnerable population down to the point where there are not enough animals to successfully breed. This three-year badger conservation project is acting on the results and recommendations from the previous five-year study. This project is assessing the feasibility of augmenting the badger population in Upper Columbia Valley. Major considerations will include likelihood of success, genetic similarity of potential source animals, risk of disease and political/legal requirements for translocation. DNA samples from East Kootenay badgers will be compared to those from other locations in BC, Alberta, Montana, Idaho and Washington to determine possible source animals.

The information obtained through this DNA analysis will also be useful for other areas of the province, such as the Thompson/Okanagan, where population augmentation may also be required. If East Kootenay augmentation is

considered feasible, animals will be translocated in Year 2 or 3 of this project.

Other conservation actions for badgers and their main prey, Columbian ground squirrels, may also be implemented. These include: propose legislative changes regarding rodent poisoning; develop protocol for handling problem badger or ground squirrel complaints; implement cooperative wildlife management and education with private developments such as golf courses; provide input into ecosystem restoration initiatives as well as conservation covenants and volunteer landowner agreements; continue public education efforts; and assess strategies to reduce roadkill, such as including additional culverts and providing openings in concrete road barriers.

Biologists will also continue using radio telemetry to assess the population dynamics of badgers in the southern portion of the East Kootenay Trench including home range size, reproductive success and mortality causes and rates.

Duration: Year 1 of 3

Partners: **Forest Renewal BC; Ministry Water, Land & Air Protection; Canada Parks Service; Invermere Veterinary Hospital; East Kootenay Environmental Society; TEMBEC Forest Industries; Local public**

BASIN-WIDE

COLUMBIA BASIN BIODIVERSITY ATLAS

Project Coordinator: Ian Parfitt, GIS Co-ordinator (Nelson)

This project supports CBFWCP's mandate to ***sustain*** and ***enhance*** fish and wildlife populations affected by BC Hydro dams by illustrating the distribution and habitat needs of those populations. The Columbia Basin is extremely biologically diverse: for example, 67% of vertebrate species in BC and 48% of total vertebrate species in Canada live in the Basin. Making the habitat needs of wildlife visible and understandable through maps can enable the public, policy makers and resource managers to better understand species and ecosystems at risk and how their activities on the ground may impact or help to conserve them. An atlas can also show what information is available and where information gaps exist.

A seamless ***biodiversity*** atlas for the entire 67 million-hectare B.C.-U.S. Columbia Basin received overwhelming support from over 40 cross-boundary government, private and First Nations participants at a two-day workshop in Nelson in March. Workshop attendees discussed geographic scope, information sources, priority information themes, delivery media, and participation. The next step is to develop a Biodiversity Atlas work plan including short-term pilot projects, confirming map scales and format, increasing the number of participating partners and establishing long-term goals. Completion of an atlas for the entire B.C.—U.S. Basin will require partnerships with many agencies as only 7.7 million hectares of the Basin falls within the Compensation Program area.

Duration: Year 2 of 2

NON-GAME SPECIES HABITAT ENHANCEMENT

Project **#W00-NL-019**

Project Biologists: John Krebs, Senior Wildlife Biologist (Nelson)
Larry Ingham, Wildlife Biologist (Invermere)
Doug Adama, Wildlife Biologist (Invermere)
Ross Clarke, Wildlife Biologist (Nelson)

Contract Bat Biologist: Mitch Firman (Calgary)

Contract Turtle Monitors: Art Gruenig (Cranbook); Brenda Herbison (Argenta)

Summer Student Technicians: Thomas Hill, Aaron Reid (Nelson)

CBFWCP has developed and implemented small-scale enhancement projects to benefit ***painted turtles***, cavity-nesting ducks and ***Townsend's big-eared bats***. These species have been affected by hydro-electric development and in some cases are blue-listed. Activities have included the creation of alternate nest sites for turtles, enhancement of cavity-nesting duck populations through installation of nest boxes and construction of a secure maternity roost for Townsend's big-eared bats. This project covers costs for development, implementation, monitoring and maintenance of these enhancement initiatives.

Specific activities planned for this year include:

- Monitor and maintain nestboxes in the Columbia Valley, Meadow Creek and Marsden areas.
- Development of interpretive signs for Elizabeth Lake and Revelstoke.
- Placement of two turtle loafing logs in Argenta Marsh.
- Control vegetation on alternate nest sites created for turtles near Argenta, Revelstoke and Cranbrook.
- Monitor use of alternate nest sites created for turtles at Elizabeth Lake, Revelstoke and Argenta.
- Monitor and maintain Townsend's big-eared bat maternity roosts near Cranbrook, including liasing with First Nations and resort developers at the St. Eugene Mission.
- Identify and implement ***Lewis' Woodpecker*** snag creation opportunities in conjunction with East Kootenay Trench Ecosystem Restoration initiatives.

These types of habitat management activities are necessary on a long-term basis to maintain and enhance wildlife populations. Specifically, this project can result in: conservation of ecologically important and vulnerable bat species; improved nesting success of cavity nesting ducks; increased wildlife viewing and hunting opportunities; and improved viability of local painted turtle populations.

Project Duration: Ongoing

Partners: **Ktunaxa Kinbasket Tribal Council; Delta Hotels; Rocky Mountain Naturalists; Golden & District Rod & Gun Club; Windermere Rod & Gun Club; City of Cranbrook; City of Revelstoke; Ministry of Transportation; Revelstoke Arrow Heights Elementary School; North Arm Wildlife Club; Nelson Naturalists; VSA Highways Maintenance; BC Hydro**

LARGE MAMMAL MONITORING Project **#W95-L-012**

Project Biologists: Larry Ingham, Wildlife Biologist (Invermere)
John Gwilliam, Wildlife Biologist (Nelson)

The Columbia Basin-wide Large Mammal Monitoring Plan helps CBFWCP evaluate the success of Program enhancement and protection activities, identify habitat areas of high-use by large mammals, and track large mammal population trends to help detect problems before they become serious.

Ungulates are benefiting from a wide range of habitat enhancement activities, including prescribed burns that are conducted annually by a number of agencies in partnership with local conservation groups. These activities are part of comprehensive long-term enhancement strategy for both the East and West Kootenays.

As recommended in the Large Mammal Monitoring Plan (1998), absolute abundance surveys were proposed for mountain goats in the East and West Kootenays last fiscal. However, due to budget constraints a number of the management units were not completed. Management Units missed last fiscal will be captured during 2001.

An absolute abundance survey is also scheduled for ***mountain caribou*** in the Revelstoke study area and carry over counts for deer will occur in the East Kootenay. Counts involve local rod and gun club participation. Previously identified transects will be counted at least four times each spring. West Kootenay will also continue with white-tailed deer spotlight counts in the Pend d'Oreille Valley. A report summarizing Pend d'Oreille white-tailed deer radio telemetry and survival information collected between 1989 and 2001 will also be completed.

Project Duration: Ongoing

Partners: **East Kootenay Wildlife Association; Canal Flats Wilderness Club; Kimberley Wildlife & Wilderness Club: Fernie Rod & Gun Club; Lake Windermere Rod & Gun Club; Traditional Bow Hunters of BC; Sparwood District Fish & Wildlife Club; Ministry of Water, Land & Air Protection; Ministry of Forests**

Bold and italic text – see Glossary for more information

CONSERVATION OF DECIDUOUS FORESTS Project **#W00-NM-012**

Project Biologists: John Krebs, Senior Wildlife Biologist (Nelson)
Larry Ingham, Wildlife Biologist (Invermere)
Ian Parfit, GIS Co-ordinator (Nelson)

Deciduous forests (Cottonwood, Birch, Aspen) are known to support a high abundance and diversity of wildlife. However, flooding from hydro-electric reservoirs eliminated significant stands of deciduous forests within the Columbia Basin. At present, remaining stands may be at risk from other more subtle threats such as alteration of natural disturbance patterns (e.g. fire suppression, intensive forest management, lack of periodic flooding). These threats are affecting the current and hence future distribution of these forests. The first phase of this project involving literature review and forest-cover based inventory was completed last year.

In 2001-2, biologists will focus on three activities: mapping key deciduous stands for potential stewardship/acquisition; incorporating deciduous stand objectives into restoration plans and prescriptions; and hosting a technical workshop on deciduous stand conservation and restoration.

This project will benefit a multitude of ecosystem components as well as provide a wide-scale assessment of important wildlife habitat.

Project duration: Year 2 of 3

TAILED FROG IN THE COLUMBIA BASIN Project **#W01-NS-017**

Project Biologists: John Krebs, Senior Wildlife Biologist (Nelson)
Doug Adama, Wildlife Biologist (Invermere)
Ian Parfit, GIS Co-ordinator (Nelson)

Summer Student Wildlife Technicians: Thomas Hill, Aaron Reid (Nelson)

Tailed frog in the Kootenays are only known to occur in the Flathead and Yahk drainages. These populations have been proposed as distinct subspecies and are currently ***red-listed*** by the BC Conservation Data Centre. Tailed frog are sensitive to ***riparian*** habitat degradation and water quantity/quality. BC Hydro reservoirs have not been implicated as causes of habitat loss for this species, however inventory initiatives have not included potential habitat adjacent to East and West Kootenay reservoirs. Habitat characteristics at known occurrences in the Yahk and Flathead River tributaries and elsewhere in the US suggest that several factors may influence presence and abundance of tailed frogs. These include absence of predacious fish, large boulder stream substrate, year-round water flow, stream gradient and riparian vegetation cover. This project will use existing information and expert opinion to develop and implement an inventory strategy that includes potentially suitable habitat in the southeast portion of the Columbia Basin. Presence/absence data along with a suite of habitat variables will be collected at inventory sites.

This information will be used to develop and implement conservation prescriptions for the long-term maintenance of tailed frog populations and their habitat.

Project duration: 1 Year

Partner: **TEMBEC Forest Industries**

CBFWCP LAND ACQUISITION Project **#W95-L-021**

Project Biologists: John Krebs, Senior Wildlife Biologist (Nelson)
Larry Ingham, Wildlife Biologist (Invermere)
John Gwilliam, Wildlife Biologist (Nelson)

Land acquisition is an effective means to ensure key parcels of wildlife habitat are protected from non-compatible uses. The CBFWCP Land Acquisition Strategy provides direction to assist in prioritising potential purchases based on their value to the fish & wildlife resource. Land recommended for purchase will depend on availability, priority ranking and cost. Ranking criteria include: habitat at risk; protecting critical habitat for species at risk; winter range capability; potential of a habitat to be enhanced and made more productive for affected species; proximity to other habitat reserves and to valuable habitats affected by hydroelectric developments; potential for partnerships to get the highest value for CBFWCP's land acquisition budget; and cost of ongoing management requirements to maintain and enhance the habitat.

CBFWCP works closely with Ministry of Water, Land & Air Protection's Land Management staff throughout the process to ensure there is co-ordination with other land acquisition initiatives. A detailed proposal outlining the parcels being considered is submitted separately for Steering Committee consideration. Final approval for the purchase of any property will be sought from the Steering Committees prior to purchase negotiations.

Depending on the nature of the parcel purchased, management and/or enhancement activities may also be required in the future. These activities are delivered within the CBFWCP Land Management Operations.

This project benefits fish and wildlife populations by protecting key wildlife habitats from incompatible land uses and fostering long-term commitment to conservation and enhancement in the Program's Columbia Basin area.

Project Duration: Ongoing

Partners: **Columbia Basin Trust; The Land Conservancy; Rocky Mountain Elk Foundation; BC Conservation Foundation; The Nature Trust of BC; Ministry of Water, Land & Air Protection**

CBFWCP LAND MANAGEMENT OPERATIONS Project **#W95-L-009**

Project Biologists: John Gwilliam, Wildlife Biologist (Nelson)
Larry Ingham, Wildlife Biologist (Invermere)
Ross Clarke, Wildlife Biologist (Nelson)

Summer Student Wildlife Technicians: Thomas Hill, Aaron Reid (Nelson)
Nicole Thomas, Tim Van Wijk (Pend d'Oreille)

CBFWCP manages approximately 3,500 ha in the vicinity of the Arrow Lakes, Pend d'Oreille River, Kootenay Lake and Columbia Lake. Detailed habitat management plans direct enhancement activities on the CBFWCP/MWLAP properties in the Pend d'Oreille Valley, along the Arrow Lakes, near Nelson and Meadow Creek.

This project supports essential weed control efforts on the Pend d'Oreille, debris piling and burning and road deactivation on the Meadow Creek properties and implementing management recommendations for the recently purchased East Columbia Lake property.

On the Meadow Creek property, biologists have removed a barn and barbed wire fence, hayed a field to rejuvenate grasslands, planted spruce seedlings and controlled weeds. ***Spotted knapweed*** control was conducted on the Marsden Face property along with general weed control at Deer Park.

Other activities planned for this year include: Meadow Creek road and landing cleanup; Meadow Creek thistle control and bobolink survey; East Columbia Lake Property Plan; and management of roads, fences and other activities as they arise.

Project Duration: Ongoing

Partners: **Habitat Conservation Trust Fund; Ministry of Water, Land & Air Protection**

SMALL WILDLIFE PROJECTS

Project **#W95-L-013**

Project Biologist: John Krebs, Senior Wildlife Biologist (Nelson)

Providing opportunities for public involvement in meaningful projects to enhance wildlife populations in the Columbia Basin is a cornerstone of the Compensation Program. This task addresses the need for increased club or organization participation with the Compensation Program. Clubs are invited to approach the Program for technical and small financial assistance in club-initiated projects within CBFWCP's project year. The funding available for each community-initiated wildlife project in this Small Works Project is up to $10,000 per project.

Projects in the past have included: construction and placement of ***nestboxes***; installation of fences around ***wetlands*** near Kimberley; caribou/snowmobile conflict sign and pamphlet near Revelstoke; planting of conifers for wildlife cover in the West Kootenays, and slashing of decadent browse and enhancement of ***ungulate*** winter habitats near New Denver.

This project enables clubs to play an active role in the enhancement of wildlife habitat, provides volunteers with the necessary funds for equipment and material and increases public awareness of CBFWCP.

Project Duration: Ongoing

Partners: **Local Community Groups**

Bold and italic text – see Glossary for more information

Small wildlife projects planned for this year include:

ROBSON VALLEY

EAST TWIN CREEK MARSH ENHANCEMENT

Project Biologist: Larry Ingham, CBFWCP Wildlife Biologist (Invermere)

Open ***wetland*** habitats comprise only 0.5% of the Robson Valley land base with the majority of these wetlands located on private land. Ducks Unlimited has identified a small 10 to 20-acre pond/marsh south of East Twin Creek on Crown Land adjacent to a harvested block. The marsh is maintained by a non-active beaver dam and fed by a small stream and spring.

The ***productivity*** of the marsh is currently poor as a result of hard water (chara near the dam) and an organic bottom. Biologists feel that this wetland would benefit from a complete drawdown for approximately 2 years. Exposure of the organics to oxygen will result in the decomposition of the organic layer and germination of aquatic vegetation. During the **drawdown** period, biologists will determine the best solution for refilling the wetland. Options may include enhancing the adjacent cutblock to encourage the establishment of willow and aspen while allowing beavers to dam the system naturally, or constructing a weir to control water levels artificially. Funds this year will be used to draw down the pond and develop a plan for refilling the wetland.

Project Duration: Year 1 of 2

Partners: **Ducks Unlimited; Robson Valley Rod & Gun Club**

SLOCAN VALLEY

RANCH RIDGE HABITAT ENHANCEMENT

Project Biologist: John Gwilliam, Wildlife Biologist (Nelson)

Summer Student Wildlife Technicians: Thomas Hill, Aaron Reid (Nelson)

Volunteer Co-ordinators: Bruce Gardiner, Vennan Mengler (New Denver)

New Denver Friends for Wildlife has partnered with CBFWCP on three mule deer habitat enhancement projects in the New Denver/Silverton area. These activities also support CBFWCP's broader West Kootenay ***Ungulate*** Habitat Enhancement strategy.

This year, the local conservation group is participating in selectively brushing four ha of ungulate winter range on Ranch Ridge located on Crown land near Roseberry. The volunteer group is coordinating the enhancement project and assisting in follow up monitoring to ensure it is benefiting local mule deer populations.

Duration: 1 Year

Partners: **New Denver Friends for Wildlife**

UPPER KOOTENAY

MCGINTY LAKE ENHANCEMENT

Project Biologist: Larry Ingham, Wildlife Biologist (Invermere)

McGinty Lake, near Kimberley, has been identified as a wetland habitat with high potential for enhancement. As well as home to a variety of waterfowl species, the wetland is used by cattle as well as a wide range of recreational users. However, water levels are determined solely by the water table which can threaten to dry up the wetland at various times of the year.

The Kimberley Wildlife & Wilderness Club has proposed and completed the installation of a larger diameter waterline under the Kimberley-TaTa Creek highway and an upgrade of the existing pumping system to deliver water from Mather Creek to McGinty Lake to maintain appropriate water levels in the wetland area.

The partners on this project are also involved in the construction of a fence surrounding McGinty Lake's riparian area. The fence will exclude cattle and should allow for the rejuvenation of rushes and other vegetation utilized by waterfowl and shore birds as nesting areas while still allowing for public access on foot.

This project complements a larger project sponsored by the range users and funded by the Grazing Enhancement Fund to provide alternate watering systems for livestock well away from this wetland.

Project Duration: 1 Year

Partners: **Kimberley Wildlife & Wilderness Club; Grazing Enhancement Fund; Ministry of Forests**

Bold and italic text – see Glossary for more information

Evolution of Columbia Basin Fish & Wildlife Compensation Program

Hydroelectric development by BC Hydro in the Columbia Basin occurred between 1960 and 1985. Some of the potential dam impacts were immediately evident, such as the Seven Mile Dam development flooding prime white-tailed deer habitat in the Pend d'Oreille Valley. Other impacts, such as decline in lake productivity, were gradual and took up to a 20 – 25 year period before becoming evident.

The Columbia Basin Fish & Wildlife Compensation Program is a joint initiative separate from—but not independent of—BC Hydro and the Government of British Columbia (Ministry of Water, Land & Air Protection, BC Fisheries) partners. CBFWCP was created in 1994, evolving from existing Mica, Revelstoke and Pend d'Oreille compensation programs as well as related activities in the Arrow and Duncan reservoir areas. The new Compensation Program formed a more comprehensive and integrated program for the BC portion of the Columbia River Basin.

CBFWCP's mandate is to deliver projects to conserve and enhance fish and wildlife populations affected by BC Hydro dam-related activities throughout the Columbia Basin. CBFWCP receives $3.2 million a year from a perpetual fund established by BC Hydro as part of the crown corporation's water license agreement.The annual allocation of these funds for fish and wildlife projects is established through a three-tiered process:

- project applications are submitted by organizations and community groups;
- Program biologists and respective Fish or Wildlife Technical Committees evaluate proposed projects based on established Acceptability and Ranking Criteria; and
- the technically-approved projects are reviewed and receive financial approval from the CBFWCP Steering Committee.

The Steering Committee, which also approves CBFWCP's Annual Operating Plan, is comprised of representatives from BC Hydro, MWLAP as well as public representatives for each of three areas (southeast Kootenays, southwest Kootenays, northern Kootenays) and First Nations.

A key component of CBFWCP's mandate is Public Consultation and Communications to build support and involvement in the Program among residents, community groups and other key stakeholders including First Nations, local governments, resource users, government agencies and the media.

1994	CBFWCP created
1995/96	CBFWCP begins operations, jump-started by projects underway from previous compensation programs and activities.
1996/97	77 fish & wildlife projects with 30 partners
1997/98	70 fish and wildlife projects with 50 partners 16 projects involving species at risk
1998/99	90 fish and wildlife projects with 90 partners (43 local community groups) 23 projects involving species at risk
1999/2000	44 fish and wildlife projects with 46 partners 15 projects involving species at risk
2000/2001	59 fish & wildlife projects with 123 partners 16 projects involving species at risk
2001/2002	42 fish & wildlife projects with 96 partners 18 projects involving species at risk

● WILDLIFE PROGRAM

Map# Project

Arrow
1 West Kootenay Habitat Enhancement
2 West Kootenay Mule Deer
3 South Selkirk Cougar Ecology & Predation

Kootenay Lake
4 Northern Leopard Frog Recovery

Revelstoke/Big Bend
6 Wolverine Reproduction and Survival

Robson Valley
7 Robson Valley Land Stewardship
8 Robson Valley Rare Bird Survey

Upper Kootenay
9 East Kootenay Enhancement
10 R M Bighorn Sheep Habitat & Population
12 Small Wetlands Conservation in R.M. Trench
13 Mountain Goat Lick Habitat Enhancement

Columbia Valley
14 Conservation of Badgers in the East Kootenays

Basin-wide
15 East Kootenay Biodiversity Atlas
16 Non-Game Species Habitat Enhancement
17 Large Mammal Monitoring
18 Conservation of Deciduous Forests
19 Tailed Frog in the Columbia Basin
20 CBFWCP Land Acquisition
21 CBFWCP Land Management Operations

Small Works Wildlife Projects
Lower Kootenay
22 McGinty Lake Enhancement
Robson Valley
23 East Twin Creek Marsh Enhancement
Slocan Valley
24 Ranch Ridge Habitat Enhancement

♦ FISH PROGRAM

Arrow Lakes Reservoir
1 Hill Creek Spawning Channel Operations
2 Arrow Reservoir Experimental Fertilization Project
3 Arrow Reservoir Trout & Char Radio Telemetry

Upper Columbia
4 Lake Revelstoke Bull Trout Radio Telemetry
5 Lake Revelstoke Littoral Habitat
6 Columbia Lake Burbot Population Estimate

Upper Kootenay
7 Upper Kootenay Bull Trout Telemetry

Kootenay Lake
8 Meadow Creek Spawning Channel
9 Kootenay Lake Fertilization & Adaptive Mgmt. Operations

Basin-wide
10 Kokanee Spawner Surveys

Small Works Fisheries Projects
Arrow Lakes Reservoir
11 Illecillewaet River Watershed Atlas
Lower Columbia & Kootenay Drainage
12 Murphy Creek Side Channel Spawner Counts
13 Blueberry Creek Barrier Evaluation & Mitigation
14 Lower Columbia Rainbow Trout Studies
15 Sproule Creek Culvert Passage & Rehabilitation
16 China Creek Habitat Inventory
17 Salmo River Telemetry Study
18 Deer Creek Restoration

NOTES

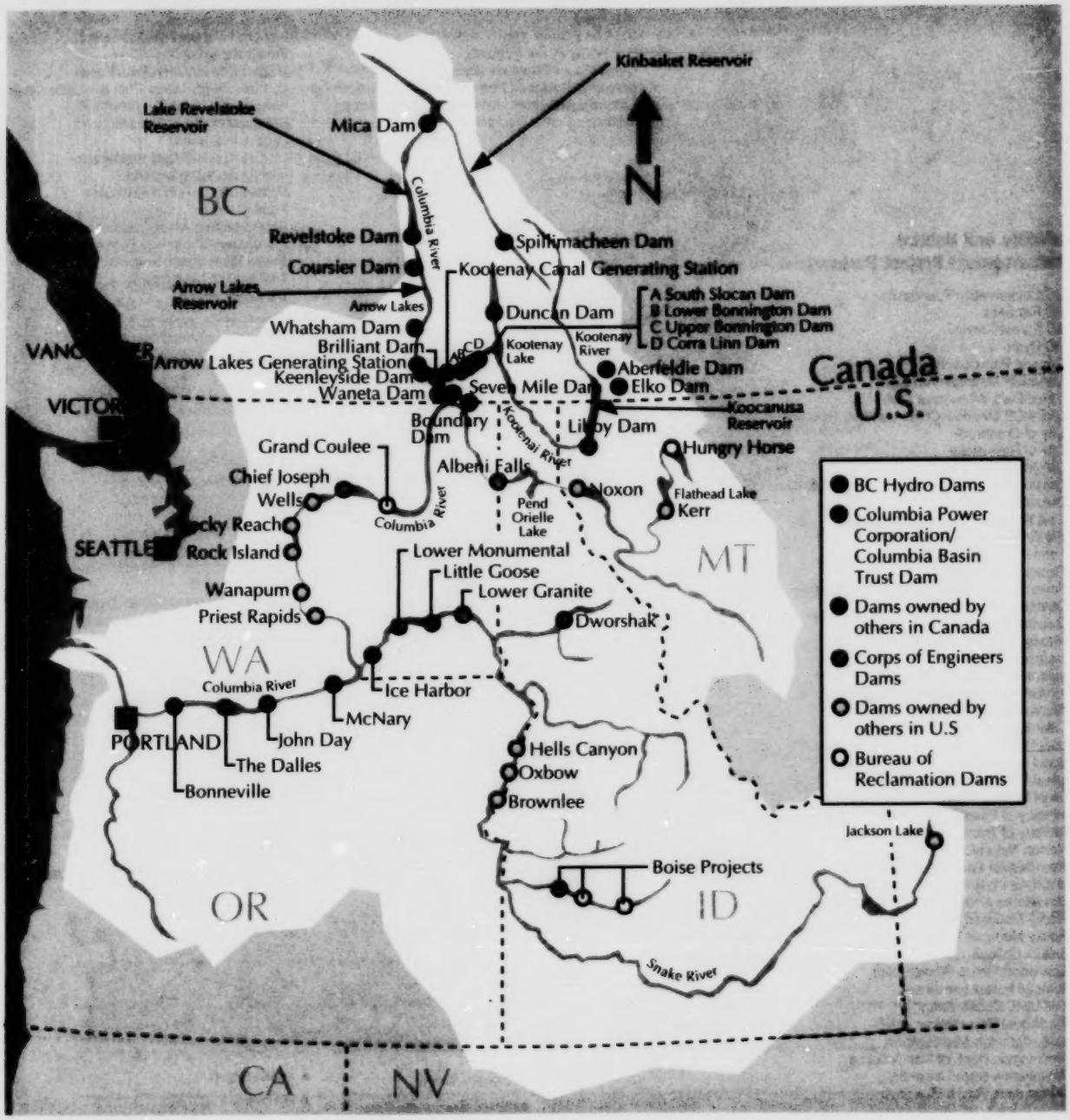
Fish and Habitat Enhancement Project Partners:

BC Fisheries
BC Hydro
Blueberry Creek Irrigation District
Bonneville Power Authority
Canal Flats Wilderness Society
Columbia-Kootenay Fisheries Renewal Partnership
Columbia Mountain Institute of Applied Ecology
Columbia Power Corporation
Deer Creek Residents
Downie Timber Ltd.
Fisheries Renewal BC/BC Hydro
Forest Renewal BC
Habitat Conservation Trust Fund
JL Crowe High School Fish & Wildlife Class
Kalesnikoff Lumber
Ktunaxa\Kinbasket Tribal Council
Local Landowners
LP Engineered Wood Products
Ministry of Transportation
Nelson District Rod & Gun Club
Parks Canada
Patagonia/Snowpack Outdoor Experience
Revelstoke Community Forest Corporation
Salmo River Streamkeepers
Trail Wildlife Association
University of BC

Wildlife and Habitat Enhancement Project Partners:

BC Conservation Foundation
BC Fisheries
BC Forest Service
BC Hydro
Canada Parks Service
Canadian Mountain Holidays
Canal Flats Wilderness Club
CBFWCP Meadow Creek-Lardeau Advisory
City of Cranbrook
City of Revelstoke
Columbia Basin Trust
Creston Valley Wildlife Mgmt. Area Committee
Ducks Unlimited
East Kootenay Environmental Society
East Kootenay Wildlife Association
Fernie Rod & Gun Club
Forest Renewal BC
Foundation for North American Wild Sheep
Golden District Rod & Gun Club
Grazing Enhancement Fund
Habitat Conservation Trust Fund
Insurance Corporation of BC
Invermere Veterinary Hospital
Kimberley Wildlife & Wilderness Club
Ktunaxa\Kinbasket Tribal Council
Lake Windermere Rod & Gun Club
Local Houndsmen,
Local Landowners
Local Ranchers
Local Wildlife Groups
Ministry of Forests
Ministry of Transportation
Nelson Naturalists
New Denver Friends for Wildlife
North Arm Wildlife Club
Revelstoke Arrow Heights Elementary School
Rocky Mountain Elk Foundation
Rocky Mountain Naturalists
Selkirk College
Sparwood Fish & Wildlife Club
Tembec Forest Industries
The Land Conservancy
Traditional Bow Hunters of BC
VSA Highways Maintenance
Washington Dept. of Fish & Game
Washington State University
Windermere Rod & Gun Club

Columbia River Drainage System



ARROW LAKES RESERVOIR AND KOOTENAY LAKE

Geographic

Columbia Basin	87,250 km2	(8.7% of BC; over 2x size of Vancouver Island)	
Arrow Lakes Reservoir	507 km2	190 km long	52,600 hectares
Kootenay Lake	405 km2	107 km long	45,187 hectares

1934 Grand Coulee Dam is constructed in Washington State to control floods and produce electricity. Stops anadromous runs of sockeye and chinook salmon and steelhead trout in the Columbia Basin, primarily in Arrow Lakes and Upper Columbia River near Invermere.

1948 Spring floods devastate houses, businesses and communities along the Columbia River in Canada and the US claiming 41 lives, leaving 38,000 people homeless. A US/Canada International Joint Commission begins study of the basin for possible sites for flood control storage projects. The Commission identified areas of storage within Canada to control future flooding situations.

1949 Mysid shrimp is introduced in Kootenay Lake as a food source for intermediate-sized rainbow trout.

1953 Cominco phosphate fertilizer plant on St. Mary river, a tributary Kootenay River is operational and causes a significant decline in water quality and an increase in nutrient levels in Kootenay Lake.

1961 Canadian and US governments sign Columbia River Treaty, requiring Canada to build large dams and storage reservoirs now called: Mica, Keenleyside and Duncan. Canadian government transfers the Canadian portion of the treaty to BC Government. US is allowed to build Libby Dam in Montana and flood land upstream in Canada (Koocanusa Reservoir).

1962 The Government of British Columbia creates BC Hydro as the "Columbia River Treaty Entity" responsible for building and operating dams and reservoirs for flood control and power production.

1964 Columbia River Treaty is ratified with the Government of British Columbia allowed to sell a 50% share of down stream benefits for 30 years to build Columbia River Treaty dams and reservoirs.

1967 Duncan Dam is constructed above Kootenay Lake and creates a 7,145 hectare Duncan Lake reservoir.

1968 Fisheries managers introduce Mysid shrimp into Arrow Lakes Reservoir as a food source for young fish-eating trout.

1969 Keenleyside Dam is constructed, flooding the two lakes to create one reservoir of water and eliminating an estimated 30% of spawning/rearing habitat.

1972 Libby Dam is constructed, affecting both fish and wildlife habitat. Nutrient retention in Kootenay Lake (phosphorus loading) declines to one-third of historical levels following pollution control measures at Cominco's fertilizer plant.

1975 Cominco fertilizer plant upgrade on St. Mary River significantly reduces discharge into Kootenay Lake.

1976 Mica Dam is constructed and begins operations with a further impact on fishing stocks. Seven Mile Dam is constructed on Pend d'Oreille River, impacting ungulate habitat. Mica and Pend d'Oreille compensation programs are created by BC Hydro to compensate for fish and wildlife impacts by the dams.

1977 Number of spawning kokanee returning to spawn in North Arm of Kootenay Lake is estimated at 1.4 million.

1980 Hill Creek Spawning Channel is completed by BC Hydro to compensate for impact of Keenleyside Dam on fish populations. The channel is 3.2 km long, 6.1 km wide with 56 settling-basin holding areas for spawners and a capacity for 150,000 kokanee salmon.

1982 Hill Creek Hatchery is completed by BC Hydro to replace anticipated loss of Arrow Lakes fish spawning capacity as a result of Revelstoke Dam.

1984 Revelstoke Dam is constructed, flooding 150 km of mainstem Columbia River and 200 km of tributaries, and significantly impacting fish stocks and habitat over a 11,560 hectare area. Cumulative impact of dams was the estimated loss of 66% of the bull trout population.

1987 Hill Creek Hatchery size is doubled to produce Arrow Lakes fish lost as a result of the Keenleyside Dam. Capacity is 100,000 fingerling bull trout, 20,000 yearling rainbow trout, 60,000 yearling Gerrard rainbow trout and up to 2 million kokanee eggs per year.

1987 Cominco fertilizer plant ceases operation permanently.

1990 Kootenay Lake South Arm kokanee stocks are virtually extinct. MWLAP, Kootenay Region Fisheries holds public meetings to explore restoration options.

1991 Kootenay Lake North Arm spawning kokanee escapement declines to 237,000.

1992 MWLAP and BC Hydro begins 5-year experimental fertilization project in the North Arm of Kootenay Lake.

1994/95 CBFWCP is created which consolidates all previous compensation programs. The Program begins delivering projects to sustain and enhance fish and wildlife populations affected by BC Hydro dam-related activities in the Columbia Basin. Funding is $3.2 million in perpetuity from BC Hydro as a part of the crown corporation's water licence agreement.

1996 CBFWCP begins accelerated projects to measure the effect of the dams on nutrient levels and fish populations in the Arrow Lakes Reservoir.

1996/97 Water levels similar to 1948 occurs along the Columbia River, but flood control from dams reduces natural flows 40% and minimizes impact. No lives or dwellings are lost.

1997 Kootenay Lake North Arm spawning escapement increases to 1.45 million. Amount of fertilizer (agricultural-grade nitrogen & phosphorus mix) is reduced after ongoing monitoring indicates the lake is beginning to retain nutrients from previous fertilizations.

1998 North Arm spawning escapement increases to 2.15 million; total kokanee population in the Kootenay Lake reaches 25-30 million; kokanee-feeding bull trout and rainbow trout caught by anglers nearing 13.6 kg (30 lb). The number of Gerrard rainbow trout spawners increases to historical levels.
Kootenay Lake experimental fertilization project results and proposed restoration plan for Arrow Reservoir are presented at 2-day Public Conference in Nelson.

1999 Upper Arrow Lakes Reservoir fertilization from the Galena-Shelter Bay ferry begins in late April.

2000 Arrow Lakes Reservoir Fertilization Project results after first year indicate algae production has increased $2^1/2$ times.

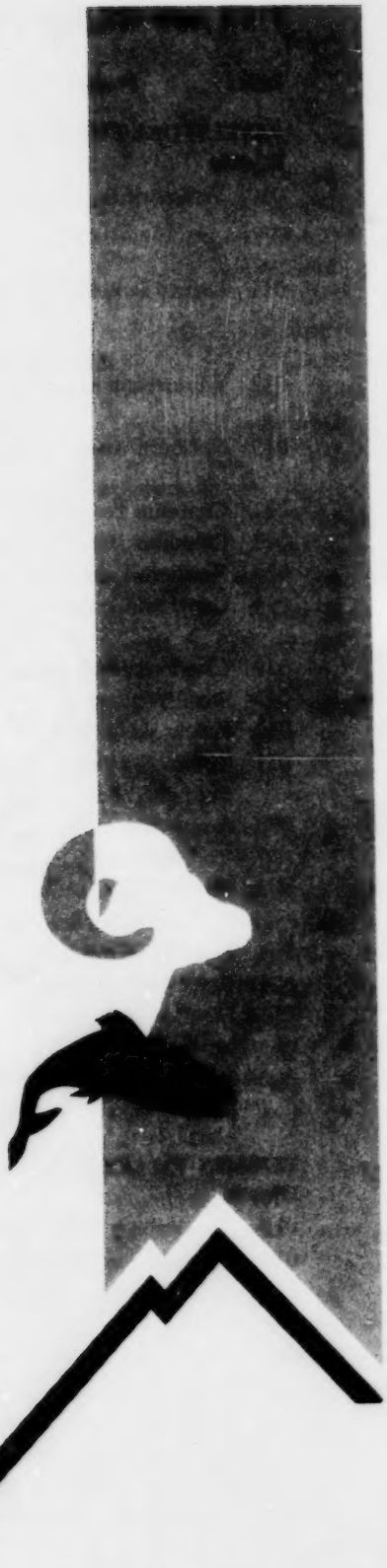
2001 The Hill Creek Spawning Channel produced over 8,000,000 fry in spring 2001 from 142,103 kokanee spawners; up substantially from 47,000 spawners in 1996 (comparison of four-year cycles). In-lake kokanee abundance in the Upper Arrow Lakes Reservoir tripled to over seven million with an estimated 10 million in the entire Arrow system. Kokanee spawner size has also jumped from 21 cm to 30 cm.

Hydro-acoustics estimated kokanee populations in Kootenay Lake to be around 17 million fish. The Meadow Creek Spawning Channel and Lardeau River produced around 19.8 million fry from 560,000 kokanee spawners compared to 1.44 million spawners in 1996. The decline is partly attributed to the reduction in fertilizer from 47 tons to 22 tons when the lake began to exhibit signs of being over-fertilized. The fertilizer level this year was returned to 47 tons to increase and maintain kokanee populations of 25-35 million.

CBFWCP
Fish & Wildlife Projects
1995 – 2001

ACCOMPLISHMENTS TO DATE

(not including 2001/2002 fish and wildlife projects)



Columbia Basin

FISH & WILDLIFE
Compensation
Program

www.cbfishwildlife.org

BC hydro

British Columbia

FISH AND WILDLIFE PROJECTS 1995 - 2001

Task#	Project	Partners	Status
REVELSTOKE/BIG BEND			
Wildlife			
010	Wolverine Ecology & Habitat Use	Ministry of Forests, Habitat Conservation Trust Fund, Canada Parks Service	1995 - 2000
011	Grizzly & Black Bear Monitoring	Friends of Mt. Revelstoke & Glacier, Canada Parks Service, BC Forest Service	1994 - 99
012	Willowbank Mountain Enhancement	Ministry of Forests, Golden Rod & Gun Club	1995 - 2000
015	Northern Long-Eared Bat	University of Calgary, Canada Parks Service	1995 - 98
021	Cummins Bio-Terrain Ecosystem Mapping	Ministry of Forests	1996 - 99
022	Columbia Mountain Caribou Research	Canada Parks Service, Ministry of Forests	1995 - 99
023	Northern Long-Eared Bat Species Status		1995 - 96
024	Crawford Creek/Arrowhead Enhancements	Revelstoke Rod & Gun Club BC Hydro	1996 - 99
039	Crawford/Alkololex Enhancement		1996 - 98
043	Small Wetland Enhancement		1996 - 98
050	Revelstoke Wetland Project Development		1996 - 97
051	Columbia Mountain Institute of Applied Ecology	Ministry of Forests, Canada Parks Service	1996 - 98
058	Arrow/Revelstoke Raptor Survey	BC Forest Service Forest industry	1996 - 97
N-2	Illecillewaet Greenbelt Nature Park Wetland Rehabilitation Survey	Illecillewaet Greenbelt Society	1997 - 98
N-4	La Forme Creek Girdling		1997 - 98
N-16	Bear-Human Conflict Education	Friends of Mt. Revelstoke & Glacier	1996 - 99
N-32	Location of Suspected Bat Hibernaculum Revelstoke Area	Revelstoke Advisory Committee Funding by Columbia Basin Trust	1998 - 99
N-34	Wildlife Tree Creation & Enhancement	Revelstoke Advisory Committee Funding by Columbia Basin Trust	1998 - 99
ROBSON VALLEY			
Wildlife			
013	Deer Habitat Utilization		1995 - 96
015	Mountain Caribou in Robson Valley		1996 - 99
017	Deer Habitat Use Monitoring		1995 - 99
020	McBride Peak Enhancement		1995 - 96
021	Raush Valley Enhancement		1995 - 96
047	Holmes River Enhancement		1996 - 97
048	Nevin Creek Enhancement		1996 - 97
049	Tete Jaune Bioterrain & Ecosystem Mapping		1996 - 97
052	Fisher Population Status		1996 - 97
N-7	Robson Valley Land Stewardship	Robson Valley Landowners	Ongoing

Task#	Project	Partners	Status
ARROW LAKES VALLEY			
Wildlife			
001	Pend d'Oreille/South Salmo Enhancement	Trail Wildlife Association, Habitat Conservation Trust Fund	1995 - 2000
	Skattebo Habitat Enhancement	Selkirk College	1999 - 2000
002	Wilson/Stagleap Biophysical Mapping		1995 - 96
003	Pend d'Oreille Bat Survey	Ministry of Forests	1995 - 96
004	Arrow Lakes Land Management		1995 - 2000
005	Forest Interior Conditions-McCormick Creek	Ministry of Forests	1995 - 96
006	Arrow Lakes Large Mammal Monitoring (Arrow Lakes Compensation Program)	Trail Wildlife Association Castlegar & District Wildlife Association	Ongoing
007	Pend d'Oreille Large Mammal Monitoring		1995 - 2000
008	Nakusp Caribou	Habitat Conservation Trust Fund, Ministry of Forests, Industry (Pope & Talbot, Slocan Forests Products)	1995 - 99
009	Arrow Lakes Reservoir Forage Enhancement	Selkirk College	1995 - 2000
015	Pend d'Oreille Valley Habitat Enhancement		1995 - 96
016	Arrow Lakes Enhancement Area Identification		1995 - 96
018	Pend d'Oreille Deer/Predator Relationships		1995 - 96
019	Amphibian & Reptile Inventory (Pend d'Oreille Compensation Program)		1995 - 96
120	Salmo River Harlequin Duck Inventory	Salmo Watershed Streamkeepers Society	1999 - 2001
025 & 040	Fort Sheppard Bioterrain Ecosystem Mapping	Trail Wildlife Association, Cominco	1997 - 98
029	West Kootenay Mule Deer Project	Washington State University, Washington Dept. of Fish & Wildlife, Ministry of Forests, Ministry of Water, Land & Air Protection	1996 - 2001
032	Arrow Lakes Land Management		1995 - 96
035	Bat Survey Species & Habitat Inventory		1994 - 95
041	Arrow Lakes Enhancement		1995 - 2000
043	Small Wetlands Enhancement	Selkirk College, City of Castlegar	1996 - 97
054	West Kootenay Mule Deer		1996 - 97
N-8	Pend d'Oreille California Bats Study	York University	1997 - 98
N-17	Ceanothus Planting	Traditional Bow Hunters of BC Trail Wildlife Association, BC Hydro, Funding by Columbia Basin Trust	1998 - 99
ARROW LAKES RESERVOIR			
Fish Projects			
001	Hill Creek Spawning Channel Operations		Ongoing
010	Arrow Lakes Reservoir Kokanee Stock Assessment		1997 - 99
012	Arrow Lakes Reservoir Paleolimnology	University of British Columbia	1997 - 98
013	Arrow Lakes Reservoir Bull Trout Life History	University of British Columbia	1997 - 2000
015	Arrow Lakes Reservoir Bull Trout Genetics/Stock Identification	University of British Columbia	1997 - 2000
016	Arrow Lakes Reservoir Rainbow Trout Hatchery		1995 - 96
024	Arrow/Kinbasket Rainbow Trout Stock ID/Distribution	University of British Columbia	1998-2001

Task#	Project	Partners	Status
038	Lower Arrow Lakes Reservoir Tributary Inventory		1996 - 97
N-22	Arrow Lakes Reservoir Water/Nutrient Exchange	University of British Columbia	1998 - 99
N-23	Arrow Lakes Reservoir Nutrient Recycling	University of British Columbia Institute of Ocean Sciences	1998 - 99
N-24	Arrow Lakes Reservoir Productivity Study	University of British Columbia	1998 - 99
N-25	Arrow Lakes Reservoir Fish Summary		1997 - 99
N-34	Tonkawatla River Rainbow Trout Habitat Enhancement	Revelstoke Advisory Committee Local landowners	Ongoing
N-36	Fissure Creek Diversion Feasibility Study	Revelstoke Advisory Committee Funding by Columbia Basin Trust	1998 - 99
N-39	Arrow Lakes Reservoir Rainbow Trout Stock Identification & Distribution	Revelstoke Fly Fishers Society University of British Columbia, Funding by Columbia Basin Trust	1998 - 99
N-40	Illecillewaet River Assessment	Local community groups, Canada Parks Service	1998 - 99
N-41	Arrow Lakes Reservoir Trout Radio Telemetry	Revelstoke Advisory Committee Funding by Columbia Basin Trust	Ongoing
N-43	Burton Creek Fish Habitat Assessment	Local community groups	1998 - 2000
N-60	Birch Creek Plunge Pool Repair	Revelstoke Rod & Gun Club, Funding by Columbia Basin Trust	1998 - 99
NL-019	Arrow Lakes Reservoir Fertilization and Monitoring	Ministry of Transportation, Revelstoke Marine Branch Columbia Power Corporation Columbia Basin Trust	Ongoing
COLUMBIA VALLEY			
Wildlife Projects			
004	Elk Habitat Use	Windermere Rod and Gun Club, Southern BC Guides and Outfitters, Rocky Mountain Elk Foundation	1995 - 96
005	Frenchman's Ridge Enhancement	Golden & District Rod & Gun Club	1994 - 97
013	East Kootenay Badger	Invermere Veterinary Hospital Canada Parks Service, Forest Renewal BC	1995 - 2001
014	Nestbox Monitoring	Invermere Rod & Gun Club Golden & District Rod & Gun Club	Ongoing
019	North Stoddart Creek Enhancement	Ministry of Agriculture & Food Ministry of Forests	1995 - 2000
029	Cottonwood Habitat Inventory		1995 - 96
030	Painted Turtle Protection Project	Rocky Mountain Naturalists City of Cranbrook	Ongoing
N-11	Rocky Mountain Bighorn Sheep Habitat & Population Assessment	East Kootenay Wildlife Association	Ongoing
N-15	East Kootenay Lynx Ecology & Habitat Study	Canada Parks Service, Habitat Conservation Trust Fund, Funding by Columbia Basin Trust	1998 - 99
N-55	East Kootenay Ground Squirrel Survey	East Kootenay Environmental Society Columbia Valley Field Naturalists, Funding by Columbia Basin Trust	1998 - 99

Task#	Project	Partners	Status
UPPER COLUMBIA			
Fish Projects			
	Sinclair Creek Rehabilitation Project	Village of Radium Hot Springs	2000
001a	Bull Trout Radio Telemetry	BC Hydro	Ongoing
010	Kinbasket Reservoir Kokanee Spawner Survey	Ktunaxa-Kinbasket Tribal Council	Ongoing
013	Akolkolex River Habitat Improvement	Watershed Restoration Program	Ongoing
017	Kinbasket/Revelstoke Reservoir Kokanee Spawning Survey	Valemount Advisory Committee, Funding by Columbia Basin Trust	1998 - 99
	TumTum Creek/Grassy Lake Habitat Improvement		1995 - 96
	Camp Creek Kokanee Spawner Survey	Village of Valemount	2000
	Lake Revelstoke Winter Creel Survey	Revelstoke Rotary Club, Columbia Kootenay Fisheries Renewal Partnership	2000-01
	Succour Arm Small Lake Development		1995 - 96
019	Upper Columbia Burbot Biology	University of British Columbia	1995 2001
021	Goldstream Creek Culvert Improvements	Ministry of Transportation	1997 - 98
028	Upper Jordan River Habitat Improvement		Ongoing
029	Kinbasket Kokanee Spawner Counts		1995 - 96
030	Dutch Creek Habitat Rehabilitation Planning		1995 - 96
031	Twin Bridge Creek Bull Trout Habitat Requirements		1995
034	Maclean Lake Outlet Spawning Platform Installation		1995
038	Canoe Reach Alpine Lake Inventory	Valemount Advisory Committee, Funding by Columbia Basin Trust	1998 - 99
039	Kinbasket Kokanee Fishery Survey		1995
040	Kinbasket Lake Spring Creel Survey		1995
048	Hugh Allen Creek Inventory & Bull Trout Assessment		1995
051	Birch Creek Enhancement	Revelstoke Rod and Gun Club Funding by Columbia Basin Trust	1998
052	Revelstoke Reservoir Tributary Fish Habitat Assessment		1995
055	Camp Creek Flow Investigations		1995
058	Twin Lakes Cutthroat Habitat Improvement		1995
065	Revelstoke Reservoir Culvert/Fish Passage Improvement		1995
066	Goldstream Creek Fish Access Improvement		1995
N-28	Camp Creek Habitat Enhancement Evaluation	Valemount Advisory Committee	1997 - 99
LOWER COLUMBIA			
Fish Projects			
N-31	Lower Columbia/Murphy Creek Rainbow Trout Studies	Trail Wildlife Association, West Kootenay Fly Fishers, BC Hydro RL&L Environmental Services	1998 - 99
045	Murphy Creek Side Channel Repairs	Trail Wildlife Association Columbia Power Corporation	1998 - 99
055	Norns Creek Spawning/Rearing Habitat Enhancement	Castlegar & District Wildlife Assoc.	1998 - 99
061	Salmo River Inventory & Fish Population Assessment		1995
062	Deer Creek Remediation Plan Enhancement	Castlegar & District Wildlife Assoc., Funding by Columbia Basin Trust	1998 - 99

Task#	Project	Partners	Status
063	Taite Creek Remediation Plan Enhancement	Castlegar & District Wildlife Assoc., Funding by Columbia Basin Trust	1998 - 99
066	Blueberry Creek Remediation Plan	Trail Wildlife Association, West Kootenay Fly Fishers, Forest Renewal BC, Columbia Power Corporation Ministry of Transportation Funding by Columbia Basin Trust	1998 - 99
071	Lower Columbia Tributary Fish Flow Requirements		1995 - 96
F-13	Little Slocan River Landslide Rehabilitation	Slocan Valley Equal Access to Public Resources Society Timberland Consultants, Funding by Columbia Basin Trust	1998 - 99
	Murphy Creek Side Channel Spawner Counts & Intake Monitoring	Selkirk College	2000
	Blueberry Creek Barrier Evaluation & Mitigation	Trail Wildlife Association, Blueberry Creek Irrigation District Ministry of Transportation, JL Crowe High School Fish & Wildlife Class, Local volunteers; Columbia Power Corp.	2000

KOOTENAY LAKE

Wildlife Projects

	Kupei Wetland Habitat Enhancement	Lower Kutenai Band, Ducks Unlimited	1995 - 96
020	Small Mammal Status	Royal BC Museum	1996 - 2000
022	Enhancement Area Identification		Ongoing
023	Kootenay Lake Purple Loosestrife		1997 - 98
053	Duncan Lardeau Enhancement	Appropriate Forestry	Ongoing
N-3	Northern Leopard Frog Status Survey	Creston Valley Wildlife Mgmt. Area	1996 - 2000
N-5	Wetland Habitat Enhancement	Creston Valley Wildlife Mgmt. Area	1998 - 99
N-30	Habitat Requirements for Rubber Boas	Creston Valley Wildlife Mgmt. Area, Funding by Columbia Basin Trust	1998 - 99
N-33	Operation Bluebird	Friends of Creston Valley Wildlife Management Area Funding by Columbia Basin Trust	1998 - 99
N-37	Habitat Use of Northern Alligator Lizards & Western Skinks	Creston Valley Wildlife Mgmt. Area University of Victoria, Funding by Columbia Basin Trust	1998 - 99
N-115	Mountain Lion Ecology & Ungulate Predation Study	Creston Rod & Gun Club, US Fish & Wildlife Service, Local Houndsmen Funding by Columbia Basin Trust in 1998 - 99	Ongoing

KOOTENAY LAKE

Fish Projects

023 & N-20	Kootenay Lake Experimental Fertilization	BC Hydro Ministry of Water, Land & Air Protection	1992 - 97
050	Duncan River Bull Trout Radio Telemetry	University of British Columbia, BC Hydro	1996 - 99
N-2	Meadow Creek Spawning Channel Operations		Ongoing
N-68	Kootenay Lake Fertilization Angling Evaluation	Angling public, BC Hydro, Funding by Columbia Basin Trust	1998 - 99

Task#	Project	Partners	Status
UPPER KOOTENAY			
Wildlife Projects			
009	Townsend's Big-eared Bat Roost Hibernaculum Conservation	Ministry of Water, Land & Air Protection	2000
108	East Kootenay Lynx Ecology & Habitat Suitability	Parks Canada, Habitat Conservation Trust Fund, Columbia Basin Trust	1996-2001
013	Upper Elk Valley Winter Range Enhancement	Elk Valley Bighorn Sheep Mgmt. Committee, Fording Coal Ltd., Luscar Ltd., Elkview Coal Corp., Crestbrook Forest Industries, Sparwood Rod & Gun Club, Fernie Rod & Gun Club, Elkford Rod & Gun Club, Columbia Basin Trust; Ministry of Water, Land & Air Protection	2000
026	Bull Mountain Prescribed Burn Enhancement		Ongoing
028	Sharp-tailed Grouse Transplant Feasibility	Montana Dept of Fish, Wildlife & Parks, Local naturalists, Local rod and gun clubs	1996 - 97
030	Saddle Pasture Prescribed Burn	Ministry of Forests	1997 - 98
031	Townsend's Big-eared Bat Roost Monitoring	St. Mary's Band Ktunaxa/Kinbasket Tribal Council	Ongoing
044	Elk Valley Riparian Assessment		1996 - 97
056	Upper Kootenay Bats	Conservation Data Centre	1996 - 97
N-6	Pickering Hills Enhancement	Ministry of Agriculture & Food, Local ranchers, Ministry of Forests, Kootenay Livestock Association, Regional District of East Kootenay Weed Program	1997 - 2000
N-9	East Kootenay Trench Grasslands Restoration	Rocky Mountain Trench Natural Resources Society, First Nations, Wildlife groups, Range Enhancement Fund, EMBER, Ministry of Forests, Ministry of Agriculture & Food	Ongoing
N-14	Upper Elk Valley Range Enhancement		Ongoing
N-20	MacDonald Marsh Wetland Enhancement	Ducks Unlimited, Aaron MacDonald-Landowner, Funding by Columbia Basin Trust	1998 - 99
N-33	Sheep Mountain Prescribed Burn	Traditional Bowhunters of BC, Funding by Columbia Basin Trust	1998 - 99
N-87	Tobacco Plains Wildlife Habitat Restoration	Tobacco Plains Band, Ktunaxa/Kinbasket Tribal Council, Funding by Columbia Basin Trust	1998 - 99
N-114	Deer Lake Ungulate Winter Range Enhancement	East Kootenay Hunters Association, Funding by Columbia Basin Trust	1998 - 99

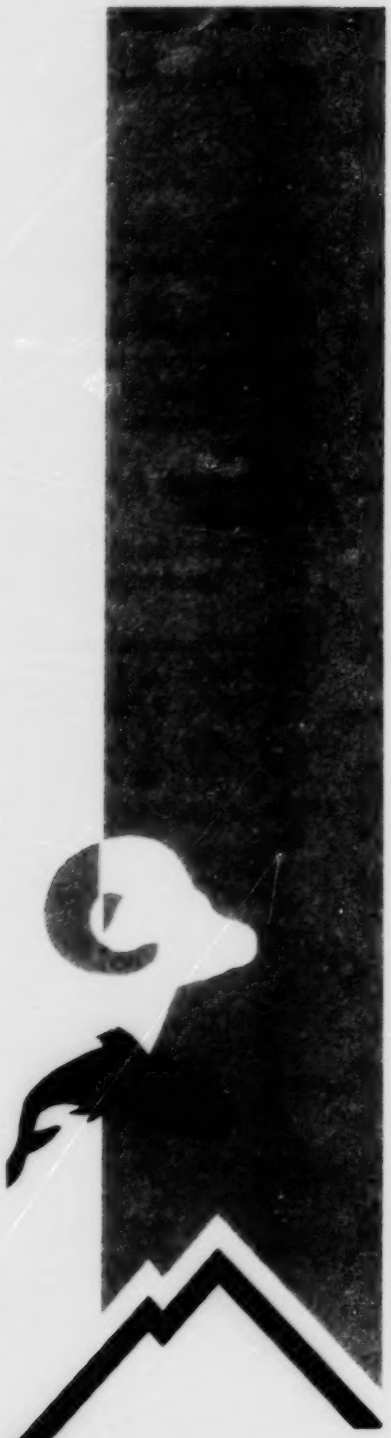
Task#	Project	Partners	Status
N-115	Bighorn Pasture Ungulate Winter Range Enhancement	East Kootenay Hunters Association, Funding by Columbia Basin Trust	1998 - 99
	Kimberley Airport Slough	Kimberley Wildlife & Wilderness Club	2000
UPPER KOOTENAY			
Fish Projects			
S-1	Cooperative Montana Studies	Montana Dept. of Fish, Wildlife & Parks, Habitat Conservation Trust Fund, Forest Renewal BC	1997 - 98
S-2	Koocanusa Creel	Montana Dept. of Fish, Wildlife & Parks	1996 - 97
S-3	Kootenay Lake South Arm Burbot		1996 - 98
S-4	Aberfeldie & Elko Aquatic Inventory	BC Hydro	1996
016	Koocanusa Kokanee Survey	BC Hydro, Montana Dept. of Fish, Wildlife & Parks	1996 - 2001
018	Koocanusa Reservoir Kokanee Spawner Counts	Fernie Rod & Gun Club, Sparwood Rod & Gun Club, Elkford Rod & Gun Club, Montana Dept. of Fish, Wildlife & Parks	1996 - 2000
027	Upper Kootenay River Bull Trout Radio Telemetry	Fernie Rod & Gun Club, Sparwood Rod & Gun Club, Elkford Rod & Gun Club, Wapati Flyfishers, Montana Dept. of Fish, Wildlife & Parks, Funding by Columbia Basin Trust	1998 - 99
034	Status of Columbia Basin Chiselmouth	East Kootenay Environmental Society, Funding by Columbia Basin Trust	1998 - 99
BASIN WIDE			
Wildlife Projects			
002	CBFWCP Land Management	Local community groups	Ongoing
003	Duck Nestbox Monitoring	Golden Rod & Gun Club, Windermere Rod & Gun Club, North Arm Wildlife Club	Ongoing
004	CBFWCP Land Acquisition	Conservation Trust Funds, Wildlife clubs Conservation groups	Ongoing
005	Enhancement Project Identification & Development		Ongoing
006	Large Mammal Monitoring Plan	Canal Flats Wilderness Club, Kimberly Wildlife & Wilderness Club, Elkford Rod & Gun Club, Fernie Rod & Gun Club, Lake Windermere Rod & Gun Club, Traditional Bowhunters of BC, Sparwood & District Fish & Wildlife Club	Ongoing
008	Site Enhancement Monitoring		Ongoing
011	Columbia Basin Biodiveristy Atlas		Ongoing
016	Wildlife Strategic Plan		1995 - 98
018	Avalanche Path Habitat Study	Ministry of Forests	1995 - 2000

Task#	Project	Partners	Status
027	Small Wildlife Projects	East Kootenay Environmental Society, Ducks Unlimited	Ongoing
030	Painted Turtle Crossing Assessment	Arrow Heights Elementary School, Revelstoke Municipal Government, Friends of Mt. Revelstoke & Glacier Ministry of Transportation BC Hydro; City of Cranbrook; Rocky Mountain Naturalists	Ongoing
032	Small Red-Listed Mammals Status Study	Royal BC Museum, Forest Renewal BC	1995 - 2000
034	Biophysical Map Digitizing		1996 - 97
B-6	Geographic Information System (GIS) Support		Ongoing
N-11	R.M. Bighorn Sheep Habitat and Population Assessment		Ongoing
BASIN WIDE			
Fish Projects			
009	Solar Aerator Testing	University of British Columbia	1995 - 96
018	White Sturgeon Conservation in Reservoirs	Habitat Conservation Trust Fund, BC Hydro	1995 - 99
031	Public Interaction - Project Identification		Ongoing
032	Angler Log Book Program	Local Anglers	1995 - 96
033	CBFWCP Fisheries Strategic Plan	BC Hydro MWLAP	Ongoing
037	Small Works Program	General Public Local wildlife clubs Local conservation groups	Ongoing

Glossary

Columbia Basin

FISH & WILDLIFE
Compensation
Program



www.cbfishwildlife.org

BC hydro

BRITISH COLUMBIA

Apthona nigriscutis
One of several insects approved for release in North America in 1989 and widely used in Western Canada, lays its eggs on leafy spurge. The larva feeds on the spurge's roots and kills the weed.

Arrow Lakes Reservoir
Created in 1968, the Arrow Reservoir is formed from two natural lakes—Upper Arrow and Lower Arrow—and has water storage capabilities of 8.8 trillion cubic meters. Water levels are maintained between 420 – 440 m. The water flow is regulated between the Revelstoke Dam and Hugh Keenleyside Dam.

Bio-agent
An insect (or microorganism) introduced in a controlled setting to help manage or eliminate a specific species (e.g. Leafy Spurge or Purple Loosestrife) where other control mechanisms such as herbicides are ineffective or environmentally unsafe.

Biodiversity
The variety, distribution and abundance of different plants, animals and microorganisms relative to the ecological functions they perform within a specific area or region.

Bioterrain
A map of the physical/geographical characteristics of a region combined with data that is relevant to wildlife habitat, including soil moisture conditions and vegetation.

Black Bears
The American Black Bear currently occupies about 85% of its historical range and has been eliminated from most of the more southerly regions of all provinces, primarily through human encroachment. Ursus americanus requires a mixed forest habitat with a variety of tree and shrub species of varying ages. While mainly vegetarians, they are also scavengers and attracted to carrion which they can scent up to a mile away. Black bears have the lowest reproductive rates of any land mammal in North America - with the possible exception of the muskox. They have several remarkable characteristics: while they mate in midsummer, the fertilized eggs remain unattached to the female's uterus until fall and their minimum body weight in preparation for hibernation is attained. The cubs are born late December to early February which the mother nurtures without having consumed any food for up to five months.

Blue-Listed Species
A **vulnerable** fish or animal that is particularly sensitive to human activities or natural events, and:

a) populations have recovered or increased to a point where extinction is unlikely as long as currently available habitat is preserved or managed;
b) populations have experienced no evidence of a decrease for the last three-to-five years;
c) populations are so low that the species is uncommon within its range or confined to a small geographic area;
d) the species' habitat requires protection and other activities in the area regulated.

Brood stock Collection
The capture of adult fish to obtain eggs and milt, primarily used in hatcheries to increase fish production.

Bull Trout

Bull trout (*Salvelinus confluentus*) are members of the char family and have recently been classified as a separate species from Dolly Varden. Found in lakes and streams throughout the upper and lower Columbia and Kootenay systems, bull trout are identified by a dusky-coloured dorsal fin without bold black marks and the spots on the trout's sides are not surrounded by light haloes. The fish is a sub-surface feeder with kokanee as its primary food source. Bull trout mature slowly and often reach five-seven years of age before beginning to spawn. They can live for more than 20 years and reach a size of nearly 13.5 kg.

Burbot

Lota lota is a member of the codfish family and recognized by its long body, elongated dorsal and anal fins, and a single barbel on the tip of the chin. The burbot, which grows up to 100 cm, is common in lakes and large rivers throughout the upper Columbia and upper Kootenay part of the Columbia River. The primary food sources for larger burbot include kokanee and other small fish, as well as aquatic insect larvae. The burbot, also known as ling cod, spawns in February at nighttime under the ice in shallow bays or in streams. A number of burbot will mill together to form a large ball which may stay together for several minutes. A sport fish, the burbot's liver contains oil comparable to salt-water cod in vitamin richness.

Canopy

A layer of foliage in a forest stand, most often referring to the uppermost layer of foliage, but the term can be used to describe lower layers in a multi-storied stand. It includes above ground leaves, branches and vegetation that provide shade and cover for fish and wildlife.

Conserve

to manage human use of living (animals, plants) and non-living (e.g. soils, nutrients) resources in an ecosystem in an attempt to restore, enhance, protect and sustain the quality and quantity of a desired mix of species and ecosystem conditions for present and future generations.

Creel Survey

The collection of data specific to the number of fish caught by sport fishers on a particular stream or in a particular area such as the Arrow Lakes Reservoir.

Drawdown

The controlled limited drainage of a body of water such as a marsh to improve wildlife habitat and food values. Drawdowns are also used as a method of flood control in reservoirs.

Duncan Dam

Built in 1967 and the first of three BC Hydro Columbia River Treaty dams, Duncan Dam is located 42 km. north of Kaslo. The 40-meter high structure created a 45 km long reservoir that holds 1.7 trillion cubic meters of water.

Duncan/Lardeau Property

A 500 acre parcel of property in the Meadow Creek area purchased by CBFWCP in 1998 to be enhanced for its wildlife values. The property is adjacent to eight similar and inter-connected properties in the area which together form corridors for traveling wildlife.

Enhance

To heighten specific environmental values of a habitat or ecosystem by management intervention to reduce the severity of undesirable impacts.

Escapement

The number of adult fish that return to their spawning grounds in a given period of time.

Extirpation
The elimination or disappearance of a species or subspecies from a particular area, but not from its entire range.

Fauna
All of the animal life found in a specific region, e.g. Columbia Basin.

Fertilization
Adding nutrients, usually phosphorus and nitrogen, to a body of water that are essential to the growth and well being of its living organisms.

Fish Technical Committee
Comprised of four members, two each from BC Government and BC Hydro, this committee is responsible for the review, evaluation and recommendation of fisheries-related projects submitted to CBFWCP.

Fry
The second developmental stage of young salmon and trout. During this stage, the fry is usually less than one year old, has absorbed its yolk sac and is rearing in the stream. The main stages of development are: egg, fry, juvenile and adult when sexual maturity has been reached.

Gerrard Rainbow Trout
A strain of rainbow trout native to the Columbia Basin system, the adult Gerrard are primarily lake dwellers and not normally found in rivers or streams, except during spawning. A slow growing fish, the Gerrard matures later than most rainbow strains and can live for up to 20 years. It feeds mainly on kokanee salmon which helps account for the size of up to 16 kg this popular sport fish can achieve. Gerrard trout over 4.5 kg consume around 200 kokanee per year. A lake with 3000 Gerrard rainbow trout would eat about 600,000 kokanee annually. The Gerrard Rainbow Trout spawn only in the Lardeau River system.

Girdling
A wildlife enhancement technique used for: creating food for browsing ungulates by stimulating suckering (creation of new growth) of favourable browse from shrubs; and creating habitat in trees for cavity-nesting birds and small mammals.

Grizzly Bears
The Grizzly Bear is a subspecies of the Brown Bear which also includes the Kodiak Bear. *Ursus arctos horribilis* are slow-growing, long-living (20-25 years) with low reproductive rates averaging 2 cubs per litter every 3-6 years. Females can grow up to 280 kg (640 lb) while males can achieve sizes of 500 kg (1150 lb) depending on the food supply within their range. Grizzlies have only six months to obtain sufficient food to last a full year. Pregnant females have less time because they den early and exit later. The species have relatively short stomaches. Consumed food passes rapidly through their systems resulting in a high rate of food consumption. In fact, starting around mid July, grizzlies feed 20 hours a day and consume more than 20,000 kcal (1,000 calories) a day in preparation for hibernation. Grizzlies compete directly - and often aggressively - with humans for food and space which greatly affects their nutritional levels and survival.
While population densities vary based on abundance and distribution of food, Glacier National Park has a density of 1:28 sq km, which is considered average. Contrary to popular belief, grizzlies have good eyesight. As well, their hearing is excellent while their sense of smell is superb. Grizzlies are omnivores and their movement patterns within their range is determined by the quality of their food supply at different times of the year. For example, moose and caribou are a main source of their diet, but primarily in the spring when yearlings and winter-starved ungulates are the most vulnerable. While they adapt slowly to changes in their environment, grizzlies can, if given time, adapt behaviorally to altered habitat.

Habitat Complexing
The application of logs, rocks and/or vegetation to enhance stream habitat for fish. For example, boulders that change the water-flow patterns and offer fish shelter are said to add complexity. Primarily, this allows for better spawning and rearing habitat as well as providing cover for fish.

Hibernaculum
The hibernating habitat for bats, typically found in abandoned mines, abandoned buildings and similar enclosures.

Home Range
The area that an animal traverses in the scope of normal activities, such as feeding. For example, the home range of a male badger in the East Kootenay area can be 500 square km, typically much larger than the home range of badgers studied in the US.

Hybridization
The process of interbreeding between two different species, such as yellowfin rainbow trout with other rainbow trout species, either in the wild or under artificial conditions.

Keenleyside Dam
Hugh Keenleyside Dam, located eight km east of Castlegar, controls a drainage area of 22,560 sq km in the Arrow Lakes Reservoir extending 232 km north to Revelstoke. The dam, 52 m high and 853 m long, includes a navigation lock providing passage for river traffic.

Kinbasket Reservoir
Created as a result of the Mica Dam and generating station, this 216 km long water storage reservoir can see its water level decrease/increase by up to 24 meters from 744 meters in late summer to 730 meters in April.

Knapweed
Introduced from Eurasia in the early 1900's and with no natural enemies or parasites, Knapweed spread rapidly across BC and became well established in this area over the past three decades. Both types of the weed, Diffuse and Spotted, are present in the Columbia Basin. **Diffuse Knapweed** is recognizable by its white (sometimes pink or purple) urn-shaped flower surrounded by yellowish green bracts with narrow stiff spines. **Spotted Knapweed** has pink to purple flowers with a black-tipped fringe, giving the flowerhead a spotted appearance. Both types contain volatile oils which have an extremely bitter, non-poisonous taste.
Both species invade grassland sites and outcompete all native vegetation. As well as severely reducing the grasses and herbs food supply of domestic animals, knapweed encroachment can also destroy wildlife forage resulting in significant declines in deer and elk populations.
Over 40,000 hectares (100,000 acres) in BC are currently infested, potentially reducing forage by up to 90% in some areas.
Successful long-term control requires a combination of proper grazing management, judicious herbicide use, bio-agent control and a high level of public awareness and responsibility. While these plants are highly resistant to most herbicides, several insects have proven effective including seed-reducing flies and moths, and a root-feeding beetle.

Kokanee
Sockeye salmon that became landlocked in BC lakes after the last ice age and adapted to their freshwater habitat, kokanee (*Oncorhynchus nerka*) occupy open waters at intermediate depths. While their primary food source is zooplankton and phytoplankton, kokanee will also eat insects and mysid shrimp. Kokanee have retained many of the biological and instinctive characteristics of their sockeye ancestors. After four to five years in the lake, red-flanked adult salmon will return to their spawning stream in the fall, lay and fertilize their eggs, and then die. The kokanee, which can grow to 4.5 kg, is a popular sport fish but serves a more important function as the main food source for bull trout and Gerrard rainbow trout.

Koocanusa Reservoir
Formed by the Libby Dam in Montana as part of the Canada/US Columbia Treaty, this reservoir is 145 km long, with the upper 68 km located in BC. Water levels are controlled by the Libby Dam at Libby, Montana, 77 km south of the BC border. The dam, constructed and operated by the US Army Corps of Engineers, is owned by the US government.

Leafy Spurge
A perennial, hardy weed that spreads by seeds as well as buds on persistent, creeping roots, leafy spurge is an aggressive competitor with no natural enemies. The weed grows quickly in clumps, forming dense and extensive stands. A nonindigenous plant, leafy spurge has spread from Pacific northwest states into the grasslands and open forests of the southern BC interior, including the East Kootenay and Boundary regions. All parts of the plant contain a milky-coloured latex juice that can poison livestock and cause skin irritations on humans. Herbicides are ineffective in controlling leafy spurge. The best control methods involve using approved Euroasian bio-agents, specifically several subspecies of flea-beetles and moths.

Lewis Woodpecker
While the Lewis Woodpecker ranges throughout Southern BC, Bull Mountain is one of the only known local wintering habitat site in Western Canada. *Melanerpes lewis*, which can grow to 29 cm from beak to tail, is identifiable by the extensive pinkish red belly (the only North America woodpecker with this colour) and wide black wings. The preferred habitat of the Lewis Woodpecker is burns, scattered or logged forests, river groves and foothills.

Limnology
The study of aquatic ecology or interactions between aquatic organisms and their physical and chemical environments.

Mica Dam
The largest of the three Columbia River Treaty hydroelectric developments, Mica rises 200 m above the riverbed and is an earthfill structure made up of 33 million cu m of gravel, sand, rock and glacial till. The dam, in operation since 1973, impounds the Kinbasket Reservoir as well as regulates water flow into Revelstoke Reservoir.

Mitigate
To reduce the severity of impacts on fish or wildlife habitat.

Moose
Alces alces is the largest member of the deer family and one of the largest land mammals in North America. Males can weigh up to 595 kg and females 418 kg. The life cycle of the moose begins with rutting season from early September to late November. After a gestation period of eight months, females typically give birth to one calf, although two is not uncommon, in late May or June. The pregnant female seeks seclusion as birth time approaches and will aggressively drive away her young from the previous year to devote her attention to the new calf. The newborn calf is licked copiously and regularly, establishing a strong cow-calf bond. Moose calves receive a substantial proportion of its food from its mother's milk until fall.
There are four subspecies of moose including the Columbia Basin's Shira's moose (*Alces alces shirasi*). They are solitary animals and keep to a small home range of 5-10 sq km. While moose are not territorial, cows are very aggressive to one another during the rut, in contrast to other antlered species.
Moose are a very hardy and adaptable species, evident in that they winter successfully in some of the coldest regions of the world. They will adapt to a variety of available forage, but their preferences is early succession plants found in new growth areas after fires and logging, willow, forbs and aquatic plants.
The primary limiting factor of moose populations is good habitat. Their winter mortality is related to snow depth, density, hardness and the duration of these factors. As well as restricting forage, deep snow leaves moose snowbound and vulnerable to wolf predation. Other mortality causes include: bear predation on calves in spring; competition for forage with deer, elk and livestock; and collisions with vehicles and trains.

Mountain Caribou

A member of the deer family, caribou are unique in that both the male and females have antlers. Nonpregnant females shed their antlers in March or April, while pregnant females will shed their antlers at the time of calving. Breeding occurs during a one-week period between mid to late October and, after a gestation of 228 days, 90% of the females will give birth to a single calf within a 10-day period.

Caribou's reproduction rate is low while the mortality rate is high. While calves are able to follow their mothers around within one hour after birth, they are highly vulnerable to predation. Calf mortality can exceed 90% where there are high densities of wolves and/or grizzlies. As well as predation, calves are susceptible to wind chill and starvation.

Caribou are highly adapted to their environment and adaptable to a changing environment. They eat a wider variety of plants than other deer species, but prefer green vascular plants, mushrooms, grasses, sedges and cottongrass. In winter when the snow crust will support their weight, caribou will shift from open habitats to forest cover seeking arboreal lichens growing on coniferous trees. As well, they can smell food buried under snow up to 18 cm.

Ideal winter feeding conditions include: irregular terrain with variable snow depths; habitat with three vegetation strata - ground, shrubs and well-spaced trees; and shallow, hard snow.

Mule Deer

The populations of Rocky Mountain Mule Deer (*Odocoileus hemionus hemionus*) is larger than all 11 mule deer subspecies in North America combined. Remarkably adaptable, this mule deer is migratory and will travel 80 km or more from summer to winter ranges. They breed in November-December and will typically bear two fawns in June which minimizes fawn exposure to late spring or early fall snowstorms.

Mule deer capitalize on abundant and nutritious forage in summer and fall for growth and weight gain, and minimize intake and expenditure in winter when energy costs are high and forage is poor. They store fat rapidly from April to October, but deplete most of it by December and reach a low weight in March. Females gain and lose weight more slowly and reach their low weight in May. The survival of mule deer is a matter of enduring too long periods of inadequate forage, an environment they have evolved in and adapted to in North America.

Intermediate feeders rather than browsers, mule deer consume a wide range of forage types in a wide range of climatic conditions. Major causes of population declines are: human encroachment in deer habitat; predation; forest fire suppression; forest encroachment; excessive hunting; and collision with vehicles.

Mysid Shrimp

An exotic shrimp introduced into Kootenay Lake from Upper Waterton Lake (Alberta) in 1949 as a supplementary food source for intermediate-sized rainbow trout and in Arrow Lakes Reservoir in 1968 for young fish-eating trout. Instead, the shrimp became an efficient competitor with kokanee for zooplankton.

Nestbox

Constructed with 1" cedar, these new custom-built homes for tree cavity-nesting ducks are placed in cottonwood and aspen trees seven to ten metres off the ground. Six species of cavity-nesting ducks use these nestboxes. While there are good stands of cottonwood and aspen trees—the ducks' preferred nesting sites—in their wetlands habitat, there are not enough natural tree cavities to support the total populations' needs.

Nitrogen
A colourless, tasteless, odourless gaseous element which makes up 78% of earth's atmosphere, nitrogen is an essential component of proteins and nucleic acids required by all living organisms. In the aquatic food chain, nitrogen enters lakes through the air as nitrates where it is converted to complex organic compounds by bacterial action and absorbed by drifting microscopic plants called phytoplankton. Phytoplankton is consumed by zooplankton which, in turn is eaten by mysid shrimp and kokanee salmon. These salmon are the main food source of bull trout and Gerrard rainbow trout. When aquatic living organisms die and decay, the complex organic compounds are reduced to nitrates again to complete the nitrogen cycle.
If lakes don't have adequate water flows and circulation, the nitrates settle on the bottom where they are locked in and effectively removed from the nitrogen cycle and the food chain. This reduces the abundance of phytoplankton and the domino effect can contribute to declines in kokanee populations and sizes.

Northern Leopard Frog
Once a very common species in northwestern US and BC, and a favourite specimen in high school biology experiments, their populations have been decimated by several causes including: diseases believed to be related to environmental stress; habitat loss; and increase in ultraviolet light exposure resulting from a thinning ozone layer. The preferred habitat of *Rana pipiens* is marshes, wet meadows, river banks and moist, open woods.

Northern Long-Eared Bat
One of the rarest bats in BC, two of only three known habitats are in the Revelstoke area. It's diverse diet includes caddisflies, moths, beetles, flies and leafhoppers. *Myotis septentrionalis* hibernates alone in caves and abandoned mine tunnels, has small maternity colonies of up to 30 individuals and females produce a single young in late June to early July.

Nutrient Levels
The amount of nutrients, particularly phosphorus and nitrogen in water bodies, in an ecosystem.

Oligotrophic
Waters that are poor in disolved nutrients, have low photosynthetic productivity, and are rich in disolved oxygen at all depths.

Painted Turtle
The most common turtle in the United States, *Chrysemys picta* is found in only southern parts of Canada and is blue-listed as a rare and vulnerable species in many parts of the Columbia Basin. Its name comes from the bright red and yellow markings on a black or greenish brown flat shell and distinctive yellow stripes on the head and neck. Painted turtles are small: only 6 to 25 cm with the female growing larger than the male.
The painted turtle breathes by forcing air in and out of its lungs by alternately contracting the flank and shoulder muscles. It can't expand its chest to breathe because the ribs are fused to the shell. The turtle prefers quiet, shallow, thickly-planted freshwater with a muddy bottom. It's main food diet includes worms, minnows and aquatic insects.
Painted turtles mate in the fall and spring. In June to early July the females travel a short distance to an area where they lay 5 to15 oval, soft-shelled eggs in a flask-shaped hole they dig with their hind legs. The eggs hatch in about 10 weeks. Lacking sex chromosomes, the sex of painted turtles is determined by temperature during incubation: low temperatures make males and high temperatures produce females. Hatchlings face heavy predation from ravens, gulls and Great Blue Herons from the time they leave the nest. Quick movements, good sense of smell and colour vision are their defenses against predators.
To rid themselves of parasitic leeches, the turtles bask in the sun on rocks, stumps or trees partially submerged in water, often in large groups. Under stressful conditions in captivity they can produce Salmonella.

Paleolimnology
The study of the physical properties of freshwater lakes in prehistoric times, specifically Upper Arrow Lake geochemistry (nitrogen, carbon and phosphorus) conditions, algae evolution and fossil zooplankton.

Partnering
The synergistic affect from pooling of resources to work together toward a common goal. This reduces duplication of effort, helps ensure that the appropriate level of resources are available. The savings in time, money and expertise can then be reinvested into other projects.

Phytoplankton
A microscopic plant life that are an important source of food for zooplankton, which are, in turn, food for kokanee and mysid shrimp. Fertilization projects underway in Kootenay Lake and the Arrow Lakes are adding nitrogen and phosphorus to these water systems to produce healthy levels of phytoplankton to stimulate the food chain.

Phosphorus
An allotropic (element that can exist in two or more forms, e.g. diamonds and graphite are allotropes of carbon) nonmetallic element in phosphates, phosphorus is a nutrient required by all living organisms. Phosphates occur naturally in the different strata of rocks throughout the earth including under bodies of water such as lakes. In the aquatic food chain, phosphates are leached into the water where it is converted by bacteria into the complex organic compound phosphorus and absorbed by phytoplankton (drifting microscopic plants).
Phytoplankton is consumed by zooplankton which, in turn is eaten by mysid shrimp and kokanee salmon. These salmon are the main food source of bull trout and Gerrard Rainbow Trout. When aquatic living organisms die and decay, the complex organic compounds are reduced to phosphates again to complete the cycle. Some phosphates settle on the bottom where they are locked in and effectively removed from the food chain. This reduces the abundance of phytoplankton and the domino effect can contribute to declines in kokanee populations and sizes.

Prescribed Burn
The planned use of carefully controlled fire for habitat enhancement. Prescribed burns are commonly used to prepare a site for planting, create a better quality browse for wildlife, manage a fire hazard and reduce pest problems. The timing of the burn is determined by a combination of conditions including weather, fuel moisture, soil moisture and relative humidity to ensure the fire is confined to the planned area. For example, the Saddle Pasture prescribed burn took nearly two years to implement because of unacceptable weather conditions.

Productivity
The gain in weight which the total number of a species in a specified area (e.g. kokanee in Kootenay Lake), or the total number of all living organisms in a specified area, accumulates in a given period of time.

Protect
To manage the conservation of ecosystems, habitat or species by management intervention.

Protection Projects
Improvements to habitats to ensure the preservation of resident fish and wildlife populations.

Public Involvement Process
An important focus of the Program where residents and interested groups are encouraged to submit specific projects in which they will participate and that will protect or enhance fish, wildlife or their habitats in the Columbia Basin.

Purple Loosestrife
Accidently introduced to North America from Europe in the 1800's, purple loosestrife has made a slow relentless invasion of wetlands across Canada. While the weed prefers wetlands, it is as devastatingly effective in dryland habitats as well. Each plant can produce up to 2.7 million seeds a year. Growing up to 2 metres high with square woody stocks, a colony of purple loosestrife forces wildlife to consume native vegetation around the weed, creating more space for new loosestrife to grow. Pulling and digging the plants by hand, a labour-intensive exercise, is still one of the most effective ways of dealing with the infestation problem.

Rearing Habitat
Areas in rivers or streams where juvenile salmon and trout find food and shelter to live and grow.

Red-Listed Species
An endangered or threatened fish or animal facing imminent extinction or extirpation (no longer live in the wild in BC but do live elsewhere) if certain factors are not reversed. These factors include: very few native populations exist; and remaining populations are declining drastically due to habitat loss, excessive harvest, natural catastrophes, environmental stresses or other factors caused by human activities such as pollutants. The criteria include:

a) the number of offspring that survive to an age where they can reproduce is only marginally higher or lower than the number of offspring that die during the same time period;
b) habitat essential to the species' survival is adequately protected for the foreseeable future through management and preservation;
c) the population is stable or increasing but their numbers are still very small;
d) captive or cultivated stock may have to be used if the remaining population isn't large enough to reproduce sufficient numbers of offspring; and
e) the factors causing the species' decline are still evident.

Rehabilitate
To restore the functions and processes of a degraded ecosystem or habitat to an effective state rather than an original state.

Restore
To return ecosystems or habitats to their original structure and species composition.

Revelstoke Dam
Located about five km north of Revelstoke, the dam created a reservoir 130 km long extending back to Mica Dam and has a surface area of 11,534 hectares. The dam is a 175 m high concrete gravity structure with a 122 m high earthfill dam.

Riparian zone
The area of land from the shoreline of a river or lake to roughly 30 – 60 metres inland. This habitat supports a wide variety of species dependent on water systems including raptors.

Rocky Mountain Bighorn Sheep

One of three types of mountain sheep in North America, the Rocky Mountain Bighorn sheep is the biggest with the ram weighing up to 143 kg and the ewe 91 kg. Few animals are as well adapted to extremes of elevation and temperature. Their preferred range is rocky escape terrain in close proximity to open stands of their preferred food: grasses, sedges and shrubs. Browse vegetation are important foods during fall and winter. The sheep is also attracted to natural and artificial salt licks, particularly during spring and early summer, to correct a sodium imbalance caused by high intakes of potassium and water from new spring forage. R.M. Bighorn sheep are highly social animals that are separated into two groups: nursery bands of ewes, lambs and subadults that stay on smaller nursery ranges; and ram bands comprised of males three years old and older that forage away from the nursery range and travel great distances to known feeding ranges. These two groups come together to rut in November/December and again in the spring as sprouting vegetation appears.

The total population of all R.M. Bighorn sheep in North America numbers less than 25,000, with over 14,000 in British Columbia. Competition with livestock for food and parasites/diseases contracted from livestock are major causes for this bighorn sheep's decline. Pneumonia caused by Lungworm, one of 51 strains of parasites and diseases they contract from livestock, have been known to decimate herds particularly in overprotected and overcrowded ranges.

Sharp-tailed Grouse

While still fairly common inland in the northwestern US and Western Canada, sharp-tailed grouse populations have been on the decline. A pale and speckled brown grouse, *Tympamuchus phasianellus* can be recognized by its short pointed tail which shows white at the sides when in flight. The displaying male inflates purplish neck sacs. The preferred habitat of Sharp-tailed Grouse includes prairie, clearings, open burns in coniferous forests, forest edges and bushy groves.

Silviculture

The science and practice of controlling the establishment, growth, composition, health and diversity of forests and woodlands. Silviculture entails the manipulation of forest and woodland vegetation in stands and on landscapes.

Spawning Channel

A man-made 'tributary' that simulates habitat conditions fish need to spawn naturally and on their own. This includes streamside vegetation and gravel beds at a uniform width and depth with pockets of deeper pools. A channel is constructed according to the species' requirements and their projected numbers. For example, the Hill Creek spawning channel is 3.2 km long and designed to accommodate 100,000 kokanee requiring .5 sq m of space for each fish.

The survival rate of fry and eggs are substantially higher in man-made channels than natural tributaries. Kokanee have a five percent survival rate in natural spawning tributaries, but 30% – 60% survival in the spawning channel.

Stand Management Prescription

A site-specific operational plan describing the nature and extent of silviculture activities planned for a free-growing stand of trees for specified social, economic and environmental results.

Sustain

To maintain desired levels of ecological processes and functions, biological diversity and productivity of an ecosystem over the long term.

Tagging
CBFWCP biologists use a variety of radio-tagging methods to gather information in fish and wildlife projects. These include radio telemetry collars on wolverines, implants in bull trout and yellow-fin rainbow trout and "fanny packs" on Northern leopard frogs. Tagging is used to study the movement, migration, habitat requirements and other behavioral characteristics of a species very accurately and cost effectively.

Telemetry
The tracking of subjects using radio transmitters and receivers, often by plane or satellite. The radio transmitters can be in the form of collars (on animals) or implants (on fish).

Townsend's Big-eared Bat
The maternal colony in the Saint Eugene Mission on the St. Mary's Band Reserve represents 25% of all known Townsend's Big-eared bats in Canada. Unlike many bat species which travel great distances to hibernate, *Plecotus townsendii* travels only about 40 km between their maternity roosts and hibernacula (hibernating roost). Also known as the Lump-nosed bat and Western Big-eared bat, they are identified by enormous ears almost one-half its body length. Townsend's Bat feeds primarily on small moths and grows to only 12 grams—little more than the weight of a loonie. A single pup is born in July and is flying in three weeks.

Ungulates
Hoofed, grazing mammals, many of which have horns and double stomaches, in the group *Ungulata*. In the Columbia Basin, these include deer, elk, bighorn sheep, moose, mountain goat and caribou.

Wetlands
Areas of land inundated by surface water and groundwater supporting vegetative or aquatic life that require saturated or seasonally saturated soil conditions for growth and reproduction. There are five wetland classes: bogs, fens, marches, swamps and shallow open waters.

Wildlife Technical Committee
Comprised of five members, three from BC Government and two from BC Hydro, this committee is responsible for the review, evaluation and recommendation of wildlife-related projects submitted to CBFWCP.

Wolverine
Solitary, secretive animals that live primarily in boreal forests and tundra areas, wolverines typically occupy back country or wilderness areas that have little human activity or development. *Gulo gulo* have few natural enemies and are very well suited for the environment in which they live. They have exceptional stamina and can cover great distances in a relatively short time period. Wolverines can withstand severe cold, exhibit keen senses of hearing and smell, have a caching instinct and can defend a food source from larger predators. Their extremely strong teeth and jaws can crush bones up to the size of the bones of an adult moose. While wolverines have poor evesight, their acute sense of smell can locate carrion buried under 200cm of snow. Their average weight is 10 – 17 kg for males and 7 – 14 kg for females.
Wolverines breed during early summer and carry the dormant unimplanted embryo until the following December or January when implantation occurs. Litters are 2 – 3 kits with each weighing an average of 84 g when born. At one per 150 – 200 sq km, wolverine population densities are low compared to other carnivores. Their home range sizes are large, averaging one every 535 sq km. Like many carnivores, their density and home range is related to the abundance and availability of food. An opportunitistic feeder, wolverines are capable predators and efficient scavengers. Carrion is a major food source, particularly moose, elk, caribou and deer. They are also a successful predator of small mammals including grouse, ptarmigan, voles, mice and squirrels. Primarily nocturnal animals, wolverines are active year round and don't migrate from their home range.

Yellow (East Kootenay) Badger

A predominently nocturnal, secretive animal that spends daylight hours underground, the badger is poorly understood because of the inherent difficulty in collecting information on the species. *Taridea taxus jeffersonii* is one of four subspecies of the North American badger and its BC range is limited strictly to the Southern Interior and the southern part of the Cariboo region.

The badger's body and other physical characteristics have moulded uniquely to its fossarial (adapted to digging) existence: stout, compact animal built low to the ground; very muscular forelegs and long curved claws up to five cm long; toes partially webbed to remove loose soil; and a body nearly as wide as it is long allowing greater maneuverability underground.

The badger breeds May-August but implantation is delayed until January or February. The female gives birth to an average of two young in March/April after an eight-week gestation period. The delayed implantation, a unique characteristic of only several mammals including the black bear, helps synchronize birth with maximum food availability to enhance their survival rate. Females breed very early, occasionally having young before they are two years old.

Badger populations are composed of two kinds of individuals: adults with established home ranges that shrink and expand seasonally; and juveniles without permanent homes that sometimes travel long distances as they disperse from their natal area. Home ranges of East Kootenay badgers overlap, averaging in size of 475 sq km for males and 46 sq km for females. Their preferred habitat is treeless areas such as grasslands, cultivated fields, cutblocks and open forests. They use a series of dens throughout their home range, usually moving to a different den daily. About 70% of the dens used were previously dug.

The badger is an efficient predator of fossorial prey, such as ground hogs, which make up most of their diet. They are opportunistic feeders and supplement their diets with a wide range of mammals, birds, eggs, reptiles, amphibians and invertebrates. This allows them to adjust to seasonal availability. As well, badger are physiologically and behaviorally adapted to deal with food shortages and cold temperatures. They can reduce heat loss and limit energy expenditure by remaining inactive within the den during the coldest periods. While badgers have few natural enemies, their populations are particularly sensitive to human-caused mortality. Roadkills, human intolerance and accidental capture in traps set for coyotes can account for 90% of badger deaths in some populations.

Yellow Fin Rainbow Trout

The Arrow Lakes traditionally supported a trophy rainbow trout fishery for the piscivorous (fish-eating) yellow fin rainbow trout. These fish were large (up to 14 kg) with a yellow-orange colour on their bellies and pectoral, pelvic and anal fins. The flooding of the lakes almost completely eradicated this stock and few of these fish were caught between the mid-seventies and early eighties.

Earlier attempts to preserve and enhance this population by collecting brood stock had some success. However, this method was very labour-intensive and insufficient numbers of adults were found and collected to help the yellow fin make a comeback.

Zooplankton

Drifting or floating microscopic animals found at various depths in lakes, rivers and seas. Zooplankton is the primary food source for kokanee and mysid shrimp.

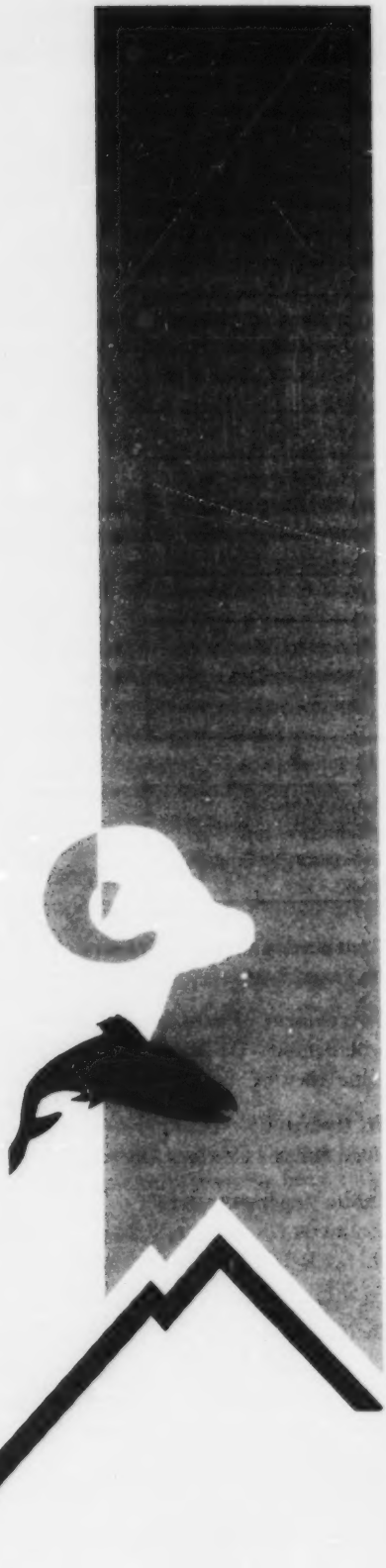
Project Application Information

Deadline for Projects is August 1. Small Project applications can be submitted anytime during the project year.

Applicants are encouraged to involve CBFWCP biologists or the appropriate representative in preparing their project applications for submission.

Columbia Basin

FISH & WILDLIFE Compensation Program

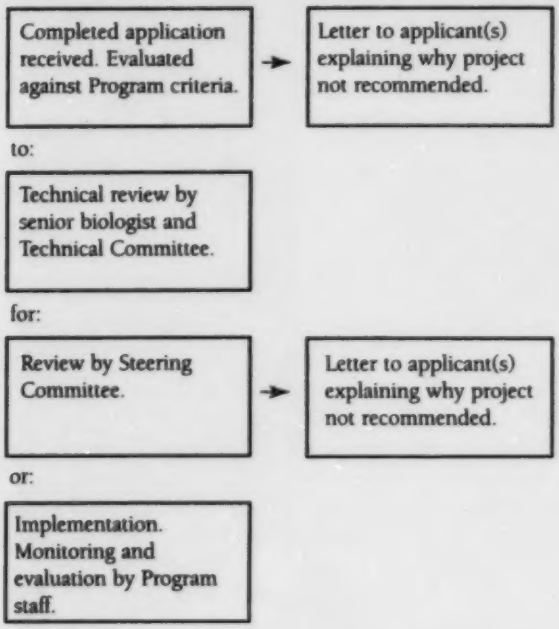


www.cbfishwildlife.org

HOW ARE PROJECTS SELECTED?

Project applications are reviewed by various individuals and committees to ensure that they are cost effective, achievable, biologically appropriate and socially desirable. The following flow-chart illustrates the process.

The final project review and selection is made by the Steering



Committee, which is also responsible for the overall direction of the Program. Members of the Steering Committee are:

Government of British Columbia
Scott Benton – Co-chair, Ministry of MWLAP (Nelson)
Jamie Alley, BC Fisheries (Victoria)

BC Hydro
Hugh Smith – Co-chair (Burnaby)

Public Representatives*
Southwest Kootenays – Richard Spilker (Nelson)
Ph. (250) 352-2660 Email: spilk@direct.ca

Northern Kootenays – Pat Wells (Revelstoke)
Ph. (250) 837-5792 Email: patwells@rctvonline.net

Southeast Kootenays – Jim Zimmerman (Elkford)
Ph. (250) 865-4556 Email: jimzim@titanlink.com

First Nations Representative*
Ktunaxa-Kinbasket Tribal Council – Joe Nicholas (Windermere)
Ph. (250) 342-6301 Email: akisqnuk@rockies.net

*You are encouraged to contact the nearest appropriate representative or Program biologist to discuss your project idea before submitting your application.

WHAT KINDS OF PROJECTS WILL NOT MEET CRITERIA?

The Compensation Program will support activities that complement and do not duplicate the work of other agencies and organizations, and will seek partnerships with other groups whenever possible.

The following activities are examples of unacceptable projects. Please ensure your project proposal does not include:

- construction of boat launches, recreational access and recreation sites
- debris clean-up on reservoirs
- ongoing administrative costs for interest groups or organizations
- compensation for individual losses resulting from hydro-electric development
- promotion of business opportunities
- formal public education projects

In addition, projects must conform with current resources management objectives and with established practices.

Project evaluation is a three stage process involving a non-ranked set of required criteria, a ranked set of criteria applied by the Technical Committees and a non-ranked set of considerations applied by the Steering Committee. Members of the Technical Committees are:

Fish Technical Committee
Jay Hammond – Chair, MoELP (Nelson)
Ken Ashley, BC Fisheries (Vancouver)
David Wilson, BC Hydro (Burnaby)
Gary Birch, BC Hydro (Castlegar)

Wildlife Technical Committee
Guy Woods – Chair, MoELP (Nelson)
Bob Forbes, MoELP (Cranbrook)
Glen Watts, MoELP (Prince George)
Ed Hill, BC Hydro (Burnaby)
Alan Chan-McLeod, BC Hydro (Burnaby)

Communications Committee
Barry Bartlett, CBFWCP (Nelson)
Sue Heaton, BC Hydro (Castlegar)
Frances Maika, MWLAP (Nelson)

1. Introduction to the Program

The Program is a joint partnership of BC Hydro (BCH) and the BC government. It was created to deliver and fund a variety of activities that help conserve and enhance fish and wildlife populations in the Canadian portion of the Columbia River system. Enhancement activities started as long as 15 years ago and some of them continue (e.g., spawning channels and hatchery operations). Other activities will evolve from new proposals submitted by members of the public, the two partner agencies or other organizations. All ongoing and new projects will be funded from the annual budget of approximately $3.2 million (indexed for inflation).

The specific objectives of the Program are to:

- Enhance existing fish and wildlife habitat in areas affected by BC Hydro's hydroelectric developments in the Columbia River Basin. For example a project to improve spawning areas at the mouth of a fish-bearing stream that feeds into a reservoir.
- Enhance habitat in other areas where the opportunity for on-site enhancement has been significantly reduced or eliminated by reservoir development. For example, a project to improve deer winter range similar to habitat lost due to flooding.

Projects will be considered for funding under this Program if they support one of the above objectives.

2. Small vs. Large Projects

This application process is designed for larger, more complex and more scientifically rigorous projects with an annual budget of greater than $10,000. A separate, simplified process is available for small projects of $10,000 or less (Small Project Application). If you are unsure which application process is more suitable for your project idea, consult the local Program office (see addresses on page 4).

3. Submission Deadline and Format

There is only one intake of large project applications each year. All applications must be received by the deadline of **4:30 pm on August 1**. If August 1 is not a working day, the deadline will move to the next working day. For example, if August 1 is a Saturday, the deadline will be 4:30 pm on Tuesday, August 4 (since the first Monday of August is a civic holiday).

Applicants should mail, courier, fax, e-mail or hand deliver one copy of the completed application package to any of the Program offices.

As explained below, the application consists of two parts: a Project Summary & Budget form and a Project Outline (see #8 below). Both must be typed. Note that proposals that are incomplete, late or hand-written will not be considered.

4. Eligible Proponents and Projects

Project proponents may be individuals or organizations. The Program will support projects that complement and do not duplicate the work of other agencies and organizations, and that involve partnerships with other groups whenever possible.

In meeting the two broad objectives of the Program (see #1 above), projects may directly address habitat enhancement or they may indirectly address habitat and population issues. Four types of activities will be considered for funding by the Program:

- **inventory** and **assessment**, to describe the current situation. For example, conducting a population count of deer in a particular area and assessing their habitat.
- **design** and **planning**, to define how the current situation can be improved. For example, researching the habitat needs of deer, comparing these requirements with the results of a habitat assessment, and developing a plan to achieve improved habitat.
- **enhancement** or **restoration** activities.
- follow-up **evaluation** and **monitoring** to ensure goals are met.

The following activities are examples of unacceptable projects. Please ensure your project proposal does not include:

- construction of boat launches, recreational access and recreation sites.
- debris clean-up on reservoirs.
- ongoing administrative costs for interest groups or organizations.
- compensation for individual losses resulting from hydroelectric development.
- promotion of business opportunities.

In addition, projects must conform with current resource management objectives and with established practices, legislation and polices (e.g., Wild Fish Policy).

5. Review Process

Applications are reviewed by Program staff and committees to ensure they are cost-effective, achievable, biologically appropriate and socially desirable. There are three steps to the review process.

1. **STAGE 1 - ACCEPTABILITY**

Any project submitted to the Program must meet the following criteria before receiving further consideration:

- Consistent with Program objectives (as stated above)
- Consistent with BC government/BCH mandates and policies, and with regional fish and wildlife management goals
- Compatible with other resource management objectives
- Based on sound biological principles
- Located within the Program area. This includes most of the Columbia River Basin in Canada, extending from the Valemount area in the north to Grasmere in the southeast and Rossland in the southwest. Note that the Flathead, Kettle and Okanagan river drainages are not included in the Program area at this time.

  If a project is not recommended following Stage 1 review, a letter will be sent to the applicant explaining why.

2. **STAGE 2 - RANKING**

Proposals that meet the Stage 1 acceptability criteria are forwarded to the appropriate technical committee (fish or wildlife) for ranking based on the following criteria:

- Contributes to conservation of indigenous species and wild stocks
- Protects or augments sensitive or valuable habitats
- Improves or maintains local or regional species diversity
- Includes ongoing/existing work requiring continuity
- Involves restoration, rehabilitation or enhancement of habitat
- Addresses a direct impact as a result of dam construction and inundation
- Adequate/logical background and planning has been completed
- Addresses an urgent requirement or threat to population maintenance and/or habitat protection
- Cost effectiveness (benefit to cost or risk ratio) and value-added aspects
- Encourages a coordinated basin-wide approach either in terms of methodology, applicability of study results or the enhancement of habitat productivity
- Ease of implementation
- Encourages innovation

For more detail on these criteria, refer to the Program Handbook or the Program website.

3. **STAGE 3 - PROJECT CONSIDERATIONS**

After the Technical Committees complete the Stage 2 ranking, recommended project applications are reviewed by the Program's Steering Committee (which includes representatives from the BC government and BCH, as well as public representatives). The following considerations are used by the Steering Committee to capture socio-economic and geographic values:

- Consistency with the Program Strategic Plan.
- Financial impact of the project on the total Program budget.
- Timeline impact on the Program's ability to meet its mandate and/or public expectations.
- Encourage the involvement of First Nations, community based groups and interested individuals.
- Other partners are involved in the project (e.g., other agencies, stakeholders or industry).
- Opportunities provided to raise public awareness of and active support for the Program.
- Geographic distribution of projects throughout the Basin.
- Meeting community and public values.
- Likelihood of the project moving from study to action.

If a project is not recommended following Stage 3 review, a letter will be sent to the applicant explaining why.

A summary of previously approved projects for both fisheries and wildlife is available from any of the Program offices or on the Program website.

6. Important Program Information

Proponents are encouraged to contact the nearest public representative and/or Program biologist to discuss project ideas prior to submitting an application.

Program offices and public representatives are as follows:

HEAD OFFICE, NELSON

CBFWCP
103-333 Victoria Street
Nelson, BC V1L 4K3
Phone: 250-352-6874 Fax: 250-352-6178
E-mail: beth.woodbridge@bchydro.bc.ca
Public representative: Richard Spilker, Castlegar.
Phone 250-365-2183. E-mail: spilk@direct.ca

EAST KOOTENAY OFFICE

CBFWCP
Box 14, D3
Unit 2 - 108 Industrial Road #2
Athalmer, BC V0A 1A0
Phone: 250-342-3941 Fax: 250-342-3986
E-mail: cheryl.persson@bchydro.bc.ca
Public representative: Jim Zimmerman, Elkford.
Phone 250-865-4556. E-mail: jimzim@titanlink.com
First Nations representative: Joe Nicholas.
Phone: 342-6301. E-mail: akisqnuk@rockies.net

REVELSTOKE OFFICE

CBFWCP
Box 500
1200 Powerhouse Road
Revelstoke, BC V0E 2S0
Phone: 250-837-2538 Fax: 250-837-9600
E-mail: karen.bray@bchydro.bc.ca
Public representative: Pat Wells, Revelstoke.
Phone 250-837-5792. E-mail: patwells@rctvonline.net

7. The Applicant's Responsibility

In addition to the work that the applicant proposes and agrees to do, there are two other important responsibilities applicants must be aware of and willing to undertake:

- once a project is accepted, adequate accident insurance and WCB coverage must be arranged for all people and activities involved for the duration of the project. This will be arranged in conjunction with the Program.
- to receive project funding, invoices accompanied by supporting documents, such as receipts, must be submitted to the Program office. Note that funds not utilized by the project are retained by the Program.

8. Application Format

The application consists of two parts:

A. *Project Summary and Budget (see form attached)*. This form is the cover sheet for the more detailed project outline described below.

B. *Project Outline*. The outline must include the following information. Please use the format and sequence outlined below.

1. Project Location

Indicate the location on a 1:50,000 map and provide a detailed, written description of the location including distances and directions from well-known features such as the nearest town, highway, body of water, etc.

2. Project Description and Rationale

Issue(s): describe why this project is necessary, what need or gap it fills, or what problem it addresses. Describe the urgency/priority of this issue on a regional or provincial scale.

Objective(s): briefly describe the project's objectives, i.e. what is to be accomplished to address the problem/meet the purpose of the project. For example, explain how habitat will be enhanced and for what species, or how information from this project will be used to restore habitat/populations in question. Include a statement on social benefits

Description of work: briefly describe the work to be done, including background information, enhancement activities, research techniques or educational initiatives. Mention any research used to develop the project. Describe the timelines for the project activities.

Measures of success: describe the measurable outcome of each activity, i.e. how the success of the project in meeting its objectives can be measured. E.g., number of hectares slashed, number of km of stream cleaned, production of a brochure. These measures of success will be used to evaluate the overall success of the project.

Proposed future work: if it is anticipated that work on this project will extend beyond the next fiscal year, out line the additional proposed phases including costs for each year. For example, ongoing maintenance costs.

3. Public Participation/Partners

The Program encourages the involvement of the public and the development of partnerships in funded projects. Describe how other partners (e.g., businesses, clubs, the general public, government agencies) are involved in the project and what resources they are contributing.

4. Credentials and Letters of Support

Provide information on the credentials of consulting companies that will be involved in the project. Letters of support may also be submitted, as well as confirmation of other contributors.

APPLICATION DEADLINE
August 1st

Columbia Basin
Fish & Wildlife Compensation Program

103 - 333 Victoria Street, Nelson, British Columbia V1L 4K3
Phone: (250) 352-6874 Fax: (250) 352-6178

Project Summary and Budget

Project Name _____
(Include a geographic name and a description of the nature of the project. E.g., Frenchman's Ridge Enhancement)

Project Description _____

_____

_____

(Provide a brief summary of project activities)

Project Sponsor (group or individual)

Name _____

Mailing address _____

Town _____

PostalCode _____

Phone _____ Fax _____ E-mail _____

Contact Person (if sponsor is group)

Name _____

Mailing address _____

Town _____

PostalCode _____

Phone _____ Fax _____ E-mail _____

Funding requested from the Program $ _____

Project Budget

Project Name _____

Prepare a budget for the upcoming fiscal year. If the project involves more than one site, complete a budget for each site.

A. Expenditures

Services	No. Days/Hours	Daily/hourly rate	Total
Professional			
Administration			
Technical			
Unskilled			

Total services $_____

Materials & Supplies

Office expenses . . . . . $_____

Equipment rental . . . . . $_____

Vehicle/boat rental . . . . . $_____

Educational material (signs, brochures, etc.) . . . . . $_____

Total materials & supplies $_____

A. Total Expenditures $_____

B. Project Funding (cash)

Other (not Program) cash contributions **confirmed** from:

_____ $_____

_____ $_____

_____ $_____

Total other cash contributions: $_____

Funding requested from the Program . . . . . $_____

(Total expenditures minus total other cash contributions)

B. Total (other + Program) Cash Contributions $_____

C. Applicant's Contributions (in kind)

Volunteer labour (@min. wage/hour) $_____

Donated equipment (@prevailing rate/hour) $_____

Other (specify) _____

_____

C. Total In Kind Contributions $_____

Total value of project (B + C) $_____

ALL APPLICANTS MUST READ, SIGN AND DATE THE STATEMENT BELOW:

I/we _____ of _____

hereby make application for financial assistance under the terms and conditions of the CBFWCP in the amount of $_____. I/we acknowledge that the Government of British Columbia and BC Hydro are not liable for any personal injury or destruction of property as a result of this project. All submissions received by the CBFWCP become the property of the CBFWCP.

Project sponsor: _____

Date _____

The completed Application Form must be received at any of the Program offices by **4:30 p.m., August 1**. Applications may be submitted by mail, hand delivery, courier, fax or e-mail.

Working with the CBFWCP to conserve and enhance fish and wildlife.

First Things First

The Columbia Basin Fish and Wildlife Compensation Program is a partnership of BC Hydro and BC Government created to deliver and coordinate activities that enhance fish and wildlife habitat in the Columbia Basin. Some of these activities are ongoing (e.g., fish spawning channel operations) or research oriented (e.g., a study of lynx habitat and ecology). Other very valuable activities come forward as small project proposals from members of the public.

Where's the Columbia Basin?

To be funded, projects must lie within the Program area, which is most of the area drained by the Columbia River in Canada. It extends from Valemount in the north to Grasmere in the southeast and Rossland in the southwest. The Flathead, Kettle and Okanagan river drainages are not in the Program area.

The Small Project Fund

Each year the Program sets aside money to support small projects (under $10,000 each). Most of this money will be allocated to projects submitted by the public, whether individuals or organizations (such as a rod and gun club or conservation group). August 1 of each year is the deadline to submit a project application. However, projects submitted during the project year will be considered, dependent on available funding.

The fund is designed to support projects such as:
- cleaning debris from a creek
- removing windfall from a deer grazing area
- a deer count in a particular area
- habitat enhancement on a small area

The following types of activities will not be funded:
- construction of boat launches or recreation sites
- debris clean-up on reservoirs
- ongoing administration costs of organizations
- individual compensation for losses resulting from hydroelectric development
- promotion of business opportunities or training

Who Decides on Projects and How?

Project applications are reviewed first by Program staff and then by the Steering Committee, which includes technical and public representatives. The reviews will consider whether the project is:
- Cost effective. Compared to the benefits to be achieved, is the cost of the project reasonable?
- Supported by partners. Does the project have partners who are contributing resources to the project? Will the applicant contribute volunteer labour, cash or in-kind donations?
- Achievable. Is the project do-able, given the time, resources, etc. proposed in the application?
- Biologically appropriate. Does the project make sense biologically and is it achieving a positive biological outcome?
- Socially desirable. Does the project increase public awareness of fish and wildlife issues?
- Lawful. Does the project adhere to legislation and policies? (e.g., the provincial wild fish policy that prohibits introduction of exotic fish into streams with wild fish.)

Help is Available

Individuals or organizations who are considering making an application are encouraged to contact the nearest Program office (in Nelson, Invermere and Revelstoke) to discuss their idea. Staff biologists will assist you to develop your project idea and complete the application.

Applicant's Responsibilities

First of all, your responsibility is to complete the work as outlined in your application. The Program does anticipate a contribution of volunteer labour to projects that it funds. As project sponsor, you must be prepared to coordinate the volunteer labour part of the project.

In addition, you must be willing to:
- ensure adequate accident insurance and WCB coverage is arranged for all participants in the project, through the Program.
- provide invoices, with supporting documents such as receipts, to the Program office to receive the project funding.

For further information, contact:

HEAD OFFICE, NELSON
CBFWCP
103-333 Victoria Street
Nelson, BC V1L 4K3
Phone: 250-352-6874
Long distance: Inquiry BC 1-800-663-7867
Fax: 250-352-6178
E-mail: beth.woodbridge@bchydro.bc.ca

Public Representative: Richard Spilker, Castlegar.
Phone 250-365-2183.
E-mail: spilk@direct.ca

EAST KOOTENAY OFFICE
CBFWCP
Box 14, D3
Unit 2 - 108 Industrial Road #2
Athalmer, BC V0A 1A0
Phone: 250-342-3941
Fax: 250-342-3986
E-mail: cheryl.persson@bchydro.bc.ca

Public Representative: Jim Zimmerman, Elkford.
Phone 250-865-4556.
E-mail: jimzim@titanlink.com

First Nations Representative: Joe Nicholas.
Phone: 250-342-6301.
E-mail: akisqnuk@rockies.net

REVELSTOKE OFFICE
CBFWCP
Box 500
1200 Powerhouse Road
Revelstoke, BC V0E 2S0
Phone: 250-837-2538
Fax: 250-837-9600
E-mail: karen.bray@bchydro.bc.ca

Public Representative: Pat Wells, Revelstoke.
Phone 250-837-5792.
E-mail: patwells@rctonline.net

CBFWCP WEBSITE
www.cbfishwildlife.org

Application for Small Project Funding

Project Name _____
(Include a geographic name and a description of the type of activity e.g. Frenchman's Ridge Enhancement)

Project Sponsor (group or individual) Name _____
Mailing address _____
Town _____ Postal Code _____
Phone _____ Fax _____ E-mail _____

Contact Person (if sponsor is group) Name _____
Mailing address _____
Town _____ Postal Code _____
Phone _____ Fax _____ E-mail _____

Project Location and Description

Describe where the project will take place and provide a reference to a well-known feature such as the nearest town, highway, etc. (e.g., Arrow Creek valley, 8 km east of Creston, north of Hwy 3) _____

Mark the general location on the attached map or provide a more detailed map if available.

Describe the goal(s) of the project. _____

Describe the activities to be undertaken. _____

Describe the benefits to fish/wildlife and the community of this project. _____

Describe any future maintenance costs or additional project costs that are anticipated for future years.

Project Budget

A. Expenditures

Contracted services _____
(e.g., professional consultant)

Materials & supplies _____
(e.g., flagging tape, notebooks, shovels, postage)

Equipment rental _____

Other (specify) _____

(e.g. mileage) _____

A. Total expenditures $_____

B. Project Funding (cash)

Other (not Program) cash contributions **confirmed** from:

_____ $_____

_____ $_____

Total other cash contributions $_____

Funding requested from the Program $_____
(Total expenditures minus total other cash contributions)

B. Total (other + Program) cash contributions $_____

C. Applicant's Contributions (in kind)

Volunteer labour (@min. wage/hour) $_____

Donated equipment (@prevailing rate/hour) $_____

Other (specify) _____

_____

C. Total in kind contributions $_____

Total value of project (B + C) $_____

ALL APPLICANTS MUST READ, SIGN AND DATE THE STATEMENT BELOW:

I/we_____of_____

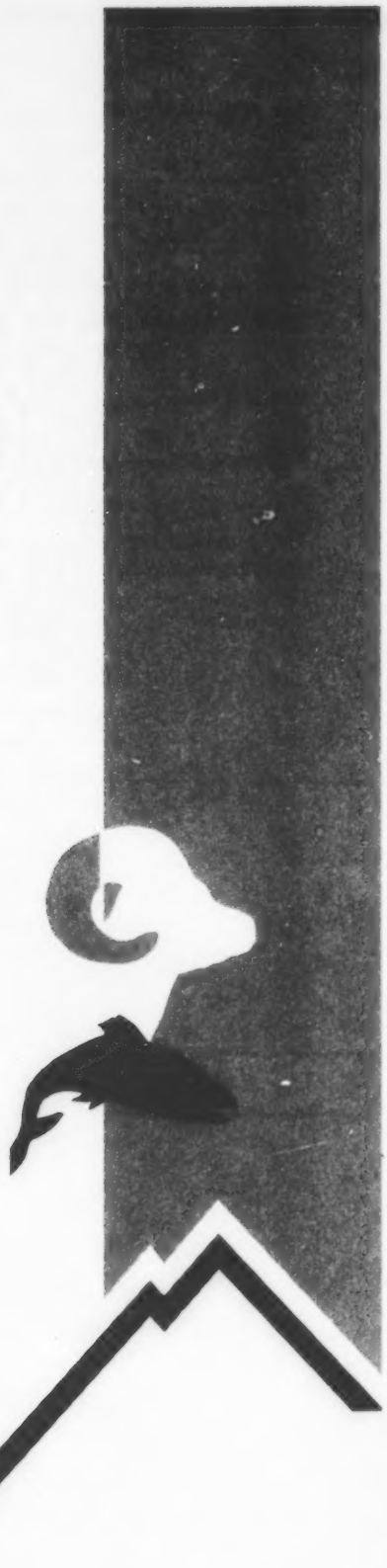
hereby make application for financial assistance under the terms and conditions of the CBFWCP in the amount of $_____. I/we acknowledge that the Government of British Columbia and BC Hydro are not liable for any personal injury or destruction of property as a result of this project. All submissions received by the CBFWCP become the property of the CBFWCP.

Project sponsor:_____

Date_____

The completed Application Form must be received at any of the Program offices by **4:30 p.m., August 1**. Applications may be submitted by mail, hand delivery, courier, fax or e-mail.

Organization and Team Member Profiles



Columbia Basin

FISH & WILDLIFE Compensation Program

www.cbfishwildlife.org

BC hydro

British Columbia

Columbia Basin Fish and Wildlife Compensation Program
103 – 333 Victoria St.
Nelson, BC V1L 4K3
Phone: (250)352-6874
Long distance: Inquiry BC 1-800-663-7867
Fax: (250) 352-6178
Email: beth.woodbridge@bchydro.bc.ca
Administration – Beth Woodbridge

NELSON HEAD OFFICE

Public Representative: *Richard Spilker* Ph. (250)352-2660 spilk@direct.ca
Born and raised in the West Kootenays and nominated by the West Kootenay Outdoorsmen, Richard is an active member in Duck's Unlimited and the Nelson Rod & Gun Club. He is familiar with public needs regarding the management of fish and wildlife resources and is a strong advocate for conserving biological diversity and wisely managing habitats. Richard is also a lawyer with the skills to communicate effectively and help facilitate concensus decision-making.

Maureen DeHaan, *Program Manager*
Maureen holds a Bachelor of Science Honours Degree in Environmental Science from Murdoch University in Perth, Australia as well as a Diploma in Forest Technology from the British Columbia Institute of Technology (BCIT). Before joining the Compensation Program in 1994, she was Planning & Assessment Manager with BC Environment and an Environmental Forester with an environmental management firm in interior BC. Maureen is a Registered Professional Biologist and Registered Professional Forester.

Beth Woodbridge, *Administrative Assistant*
Beth joined CBFWCP in 1995 and has 18 years of administration experience with BC Hydro. She applies a broad range of administrative and public interaction experience to what she considers "the perfect job". As the front line person—the first voice you hear when you call the Nelson office—Beth views her role as: "I'm here to help people who are interested in the Program in what ever way I can".

John Krebs, *Senior Wildlife Biologist*
John has extensive experience in both wildlife management and technical forestry, particularly in the Columbia Basin region. A biology graduate from Simon Fraser University, he earned his Masters in Science Zoology from the University of Alberta as well as a Diploma in Fish, Wildlife & Recreation from BCIT. An active member of the Western Forest Carnivore Committee and the North Columbia Mountain Ecological Research Group, John has published over 15 reports on his research work. He has been with compensation programs in the Columbia Basin since 1992. John is a Registered Professional Biologist.

John Gwilliam, *Wildlife Biologist*
A wildlife biologist with compensation programs in the Columbia Basin since 1980, John has a broad range of hands-on wildlife management, habitat enhancement and public involvement experience throughout the area. He was involved in the Pend d'Oreille Wildlife Management Plan as well as developing timber harvesting plans and prescribed burns programs as habitat enhancement techniques. A graduate of the University of Victoria in Biology, John has published a series of reports on his research and programs in the Columbia Basin.

Harald Manson, *Senior Fisheries Biologist*
A graduate of the University of British Columbia with a Bachelor of Science in Zoology, Harald spent 27 years with the Ontario Ministry of Natural Resources before joining CBFWCP. His last position at the Ministry was Operations Supervisor, overseeing the delivery of aquatic research and assessment programs on Lake Erie and Lake St. Clair.

Steve Arndt, *Fisheries Biologist*
Steve has been involved in fisheries-related work in Ontario and New Brunswick since 1982. A Masters of Science graduate from the University of New Brunswick, he is the author of a number of reports on salmonid growth and field assessment. Steve's main interests are fish population dynamics and fisheries management.

Bob Lindsay, *Regional Fisheries Biologist*
Bob is responsible for all fisheries management in the West Kootenay for the MWLAP, and has been dealing with fisheries management issues in the Kootenays for 25 years. A graduate from the University of British Columbia with a Bachelor of Science in Biology, Bob is also a Registered Professional Biologist.

Dr. Elizabeth Wright, *Large Lakes Biologist*
Elizabeth is the CBFWCP coordinator for the Kootenay Lake and Arrow Lakes Reservoir fertilization operations. She has a Ph.D. in Natural Resource Sciences, M.Sc. in fisheries biology and B.Sc. in Marine Biology with extensive experience in acidic lake restoration and food web ecology including the evaluation of freshwater habitat, food resources, zooplankton, fish production and population distribution. Her experience also includes liaising with the public and angling groups.

John Bell, *Fisheries Technician*
John is a graduate from Lethbridge Community College's Renewable Resource Management Program with a Fisheries Technician diploma. He worked with the Provincial Fisheries Branch in Williams Lake, Cranbrook and Prince George prior to relocating to Nelson in the late 1980's.

Grant Thorp, *Fisheries Technician*
Grant graduated from Selkirk College in 1980 with a technical diploma in Renewable Resources. He has worked at the Hill Creek Hatchery & Spawning Channel since 1979.

Bob Millar, *Fisheries Technician*
Bob, a graduate from Selkirk College's Fish, Wildlife & Recreation Program in 1990, has been working at Hill Creek Hatchery since 1989.

Ross Clarke, *Contract Wildlife Biologist*
Ross has a broad range of experience in both wildlife enhancement and forestry in British Columbia and Alberta. A graduate of the University of Alberta with a Bachelor of Science in Forestry, he has spent 15 years as a consultant for both government and private industry. Ross has worked with the Compensation Program since 1995. His main interests are in habitat enhancement/restoration and wildlife management.

Ian Parfitt, *GIS Coordinator*
Ian Parfitt graduated from the University of BC with a Bachelor of Landscape Architecture in 1990. He has been using computer-based geographical information systems (GIS) to support ecosystem and species conservation in BC for eight years, the past four years with CBFWCP. Ian has also worked with the Geography Department at UBC and the Long Beach Model Forest Program in Ucluelet.

Barry Bartlett, *Contract Public Communications Coordinator*
Barry is a photojournalism graduate from Vancouver's Langara College with several years experience in BC community newspapers and 13 years in communications in the energy, manufacturing and forestry sectors prior to joining CBFWCP in 1997. He has received professional recognition for his work including best newsletter in Canada and, as part of a team, best corporate communications program internationally.

EAST KOOTENAY OFFICE

#2, 108 Industrial Rd. #2
Athalmer, BC V0A 1K5
Phone: (250) 342-3941
Fax: (250) 342-3986
Email: cheryl.persson@bchydro.bc.ca

Public Representative: ***Jim Zimmerman***, Elkford
Ph. (250) 865-4556 Fax (250) 865-2343 E-mail: jimzim@titanlink.com
Jim has been a public representative since CBFWCP's inception in 1995. He was appointed because of his involvement with the Elkford Rod & Gun Club, his understanding of local fish and wildlife issues and his demonstrated ability to bring together different groups to work on a common goal and achieve results. Jim was actively involved in the 1998 acquisition of the 88-ha Musil property for its wildlife values and opportunities for conducting hands-on habitat enhancement activities. He also instructs courses in firearm safety and hunter training.

First Nations Representative: ***Joe Nicholas***, Windermere
Ph. (250) 342-6301 (Columbia Lake Band Office); (250) 342-6301 (home) E-mail: akisqnuk@rockies.net
Joe was appointed by the Ktunaxa/Kinbasket Tribal Council, which includes the Columbia Lake, Lower Kootenay, St. Mary's, Shuswap and Tobacco Plains bands. A chief of the Columbia Lake Band for 15 years and currently a band councilor, Nicholas was a member of the Columbia Basin Trust Committee and serves on the Canadian Columbia River Inter Tribal Fisheries Commission. Nicholas has had a lifetime interest in wildlife and wants to help address conservation issues resulting from the dams and growing economic development of the region.

Larry Ingham, *Wildlife Biologist*
Larry has been involved in wildlife compensation programs in the Columbia Basin since 1992. As well, he has extensive experience in the region as a wildlife biologist for BC Environment, BC Conservation Foundation and the Kootenay Wildlife Heritage Fund. Larry is a Simon Fraser University graduate in Biology and a BC Institute of Technology graduate of the Fish, Wildlife and Recreation Program. His habitat enhancement proposals have been recognized with two awards of excellence from the Habitat Conservation Trust Fund. Larry is a Registered Professional Biologist.

Cheryl Persson, *Administrative Clerk*
Cheryl has been overseeing the administration of the Invermere Office since joining the Compensation Program in 1996 from Alberta where she worked for the University of Calgary and in the oil and gas industry. She has an extensive background in computers and accounting and has been instrumental in developing and maintaining the Program's data management system. Cheryl is also a volunteer fire fighter.

Bill Westover, *Regional Fisheries Biologist*
Bill has worked as a fisheries biologist for the MWLAP for 27 years and is responsible for fisheries management in the East Kootenays. Bill has a Bachelor of Science in Biology from the University of Victoria and is a Registered Professional Biologist. Much of his work over the last 5 years has focused on bull trout in the upper Kootenay drainage including the Wigwam River and Skookumchuck Creek.

Doug Adams, *Contract Wildlife Biologist*
Doug has worked as a contract biologist for the Compensation Program for 5 years. A lifetime resident of the Columbia Valley, he holds a Bachelor of Science in Biology from the University of Victoria. He has worked extensively on habitat enhancement and grassland ecosystem restoration projects throughout the Columbia Basin.

Dave Lewis, *Contract Wildlife Technician*
Dave, a graduate of Lakeland College's Environmental Science Program with majors in fish and wildlife, worked with the Mica Compensation Program before joining CBFWCP in 1995. A certified trapper and immobilization/animal handler, Dave works on a range of predator and large mammal projects as well as conducts many of the monitoring and surveying activities relating to Program wildlife projects in the southeast and northern Kootenays.

REVELSTOKE OFFICE

BC Hydro Bldg.
PO Box 500
1200 Powerhouse Rd. Revelstoke, BC V0E 2S0
Phone: (250) 837- 2538
Fax: (250) 837-9600
Email: karen.bray@bchydro.bc.ca

Public Representative: ***Pat Wells***, Revelstoke Ph. (250) 837-5792 E-mail: patwells@rctonline.net
Pat is a 17-year Revelstoke resident with extensive fish and wildlife conservation experience including chair of the Revelstoke Rod & Gun Club Habitat, Access and Land Use Committees; director of the BC Wildlife Federation and BC Conservation Foundation; founder of the North Columbia Resource Council; and a member of the CBFWCP Revelstoke Public Advisory Committee. Pat has also been participating in a variety of conservation projects such as wildlife mortalities on transportation corridors and grizzly bear management.

Karen Bray, *Fisheries Biologist*
Karen has a Masters of Science in Watershed Ecosystems from Trent University in Ontario and a solid background in the theories, principles and practices of aquatic sciences and habitat rehabilitation. She also has extensive training and experience in methods of assessing and managing habitat, fish populations and environmental impacts. Karen is the author of numerous publications and presentations on aquatic habitat conservation and restoration. Karen is a Registered Professional Biologist.